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Institutional and Financial Alternatives and Recommendations: AMBAG Section 208 Water Quality Management Plan

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16. Abstracts This report describes the institutional mechanisms, intergovernmental arrangements and sources of financing that are recommended to implement the Association of Monterey Bay Area Governments Water Quality Management Plan for Monterey and Santa Cruz Counties. Recommendations are presented for institutional responses to a total of eight case studies (lake maintenance, septic system maintenance, control of erosion and sedimentation, control of nitrate pollution of groundwater, preventing saltwater intrusion, preserving groundwater recharge areas, and prevention of pollution from sanitary landfilled leachate). Recommendations are also made for a continuation of the Section 208 Water Quality Management Planning process. The institutional arrangements feature maximum reliance on existing powers of existing local governments. A newly authorized governmental mechanism in California -- the On-site Wastewater Disposal Zone (OWDZ) -- is recommended for management of septic systems, but this approach does not involve creation of new governmental entities. The report includes an analysis of the impact of California's Property Tax Limitation Initiative on the fiscal ability to meet water quality objectives.

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INSTITUTIONAL AND FINANCIAL ALTERNATIVES AND RECOMMENDATIONS AMBAG SECTION 208 WATER QUALITY MANAGEMENT PLAN

Prepared for the

ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS
SECTION 208 WATER QUALITY MANAGEMENT PROGRAM

By
McDonald & Grefe, Inc.

In Association with
Sedway/Cooke

May, 1978

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I. INTRODUCTION AND SUMMARY

The Federal Water Pollution Control Act amendments of 1972 require that "...to the extent practicable, waste treatment management should provide control or treatment of all point and nonpoint sources of pollution." Furthermore, the United States Environmental Protection Agency (EPA) has determined that, as a matter of policy:

> "Regulatory programs are required for nonpoint source control where they are determined to be the most practicable method of assuring that an effective nonpoint source control program is implemented. Determinations of practicability shall be based on economic, technical, social and environmental factors. Nonregulatory programs may be approved only where such programs will result in implementation of a nonpoint source program which will result in the achievement of desired water quality goals. If, after a period of implementation, a nonregulatory program is determined by EPA not to be effective, then it will be presumed that a regulatory program is the most practicable means to assure program implementation." (20)

The Association on Monterey Bay Area Governments (AMBAG) is the designated Water Quality Management Agency for Monterey and Santa Cruz Counties under Section 208 of Public Law 92-500. In its efforts to develop a water quality management plan and program, AMBAG adhered carefully to the federal policy described above. Considerable emphasis was given to regulatory approaches to water quality and to other approaches that did not involve conventional collection and waste treatment.

The present report deals with the institutional and fiscal arrangements that could be used to implement the Section 208 water quality plan. The term "institutional/fiscal" is used to refer to the forms of government organization, intergovernmental cooperation, government/private sector arrangements and the regulatory techniques that can be used for implementation. The term also includes the financing techniques, sources of revenue and ultimate fiscal burden on households and other taxpayers that is associated with the water quality program. The "institutional/fiscal" alternatives are distinct from, but supportive of, the "management" techniques connoted by the term "best management practices" that may be used to implement water quality strategy.

A. The Scope of the Institutional and Fiscal Analysis

The fundamental approach used by AMBAG to develop its Section 208 plan included two separate steps.

- Case studies were analyzed in detail in subareas of the AMBAG region to deal with the major surface and groundwater problems. It was recognized that time and budget did not permit any regionwide analysis of such significant problems as maintenance of water quality in lakes or mitigation of increasing nitrate concentrations in the groundwater. The case studies were selected to be as representative as possible of a significant water quality issue, but at the same time, to be of manageable proportions, so that thorough, practical solutions could be recommended.

- Insofar as possible, results from the case studies would be used as a basis for recommendations that were applicable to the entire region. It was recognized from the outset that technical details would, in many cases, have to be the subjects of more detailed studies after the Section 208 program was adopted initially.

The analysis of institutional and fiscal alternatives follows the same strategy as the technical analysis. Institutional and fiscal alternatives were considered, and recommendations were made for the case studies. Then, institutional and fiscal recommendations for the two-county region were prepared. The regionwide recommendations were based, insofar as possible, on the results of the case studies, but included considerations that did not necessarily apply to any of the cases that were evaluated in detail. The intent was to produce recommendations for the case studies that could be implemented immediately. They should not conflict with regionwide solutions that may be adopted at a later date, but they were designed first and foremost to be responsive to each individual case study.

The criteria that were used in the evaluation of institutional and fiscal alternatives included the following.

- Authority. Does the recommended agency have the necessary authority and technical capacity to implement the technical solutions?

- Consistency with adopted policy. Would the proposed institutional and fiscal arrangement support public objectives other than those related strictly to water quality management?

- Geographic coverage. Do the jurisdictional boundaries of any proposed agency coincide with the location of the population that will benefit?

- Financing powers. Does the proposed agency have adequate and appropriate financing powers for the recommended technical solution?

- Fiscal implications. Will the proposed agency arrangements and financing plan have adverse impacts on the tax base or services of any other agency?

- Economic implications. Does any proposed institutional arrangement affect economic development in the region or in the locality?

- Governance. Is the institution's governing body responsive to implementation requirements and accountable to the public?

- Ease of implementation. Is additional statutory authority required for the institutional or fiscal alternative to function?

- Flexibility. With what difficulty could the institutional or fiscal arrangements be revised if they proved to be less than satisfactory in practice?

A preference was given to the powers and capabilities of existing agencies. Many of the technical solutions for water quality problems clearly depended on the participation of general purpose governments (cities and counties) who can control or regulate land uses. In addition, all the technical alternatives that were considered appeared to be within the range of skills that are, or should be, possessed by existing cities, counties and special districts. A preference for existing governments did not mean that no new entities would be recommended if there were a clear purpose for a new government agency. For example, a new entity might be considered if the boundaries of existing entities did not coincide with the boundaries of an identifiable water quality problem. Even in such an instance, California law provides for "new" special districts that are, in fact, governed by officials of existing general purpose governments, and that can be staffed by existing agencies.

B. The Case Studies

A total of seven separate subject areas were evaluated as part of the AMBAG Section 208 planning program. Some of these were restricted to a limited geographic area, while others emphasized a particular area, but produced conclusions that were generally applicable to the two-county region.

1. Water Quality at Laguna Grande/Roberts Lake

Laguna Grande and Roberts Lake are two closely related bodies of water located in the shorezone area where the City of Monterey adjoins the City of Seaside. They have both suffered significant pollution, and are rapidly filling in because of the effects of polluted run-off from streets, erosion and, in the case of Roberts Lake, windblown sands.

The existing institutional arrangements are quite complex. The lakes themselves are located in incorporated areas (Roberts Lake within the boundaries of the City of Seaside and Laguna Grande partially in the City of Seaside and partially in the City of Monterey). The drainage basin that is contributing to water quality problems is partially in these two jurisdictions, but partially in the City of Del Rey Oaks and partially in unincorporated area in Monterey County. Portions of the watershed are under the control of the U.S. Army's Fort Ord. A major development plan in the watershed (the "Monterey II" project) would lead to annexation of the area to the City of Monterey.

Laguna Grande has recently been acquired as a part by a Joint Powers Authority consisting of the Cities of Seaside and Monterey and the Monterey Peninsula Regional Park District.

A solution to the water quality problems of the two bodies of water requires both that existing in-filling be corrected and that future pollution loadings be limited to prevent in-filling again over a very short time period. The technical alternatives that have been considered include:

- Dredging Roberts Lake by two additional feet and Laguna Grande by four feet, at an approximate cost of $450,000;
- Bentonite sealing applied to the bottom of Laguna Grande to prevent residual sediments from polluting the Lake, at a cost of approximately $12,000;
- Increasing water levels at Roberts Lake by adjustments in the outlet culvert, at a cost of $5,000;
- Aeration of Laguna Grande and Roberts Lake to preserve an aerobic condition, at an initial cost of approximately $6,000, with annual costs of approximately $600;
- Instituting a vacuum streetsweeping program to reduce pollutant loads at Laguna Grande by nearly two-thirds;
- Installing a sediment trap either at Work Memorial Park in the City of Del Rey Oaks or at the inlet to Laguna Grande;
- Requiring on-site retention of stormwater and revising development standards to reduce erosion and other sources of sediment; and
- Implementing other techniques, such as stabilization of the sand dunes, relocating an existing wildlife habitat from

Laguna Grande to Roberts Lake and instituting high standards of development, maintenance and refuse collection at the proposed Laguna Grande Park.

The recommended institution to implement some or all of the alternative technical solutions is a Joint Powers Authority (JPA). Members would include the County of Monterey, the Cities of Del Rey Oaks, Monterey and Seaside, and the Monterey Peninsula Regional Park District. The JPA would be responsible for implementing such direct solutions as dredging, aeration and vacuum streetsweeping. Solutions related to the police power over land, such as revised grading/erosion/sediment control ordinances and using revised roadway standards and cluster developments to reduce impermeable surfaces would be the responsibility of the County and the cities. They could coordinate these elements of the overall strategy through their membership in the JPA. It is anticipated that one of the cities or the County would be assigned the responsibility for actually implementing the physical solutions, with appropriate contractual mechanisms between the "operating agency" and the JPA being negotiated at the time that the JPA is established.

Maximum feasible use would be made of federal Clean Lakes Grants and other grant programs. Cost sharing arrangements for the required local share of grant programs and for ongoing operating costs would be negotiated as part of the JPA agreement. It should be noted that there is no requirement that all members of the JPA make equal financial contributions. It would also be possible to exclude one or more members of the JPA (e.g., the Monterey Peninsula Regional Park District) from participating financially in elements of the overall pollution control strategy that are clearly not within the scope of that agency's mission.

A County Sanitation District was considered as an attractive alternative to the JPA, because:

- It could establish a tax rate applicable only to the Laguna Grande/Roberts Lake watershed; and
- It would have more permanence than a Joint Powers Authority.

This alternative had overwhelming disadvantages. There is no assurance that the residents of the watershed would approve a reasonably acceptable tax rate, applied only to the real property in the watershed. Since both bodies of water are natural resources with considerable recreation potential, the benefits of which extend beyond the boundaries of the watershed, it would be inappropriate to limit financial support to this area.

Reduction of windblown sands that are now filling in Roberts Lake should be accomplished by the State Department of Parks and Recreation. Changes in wildlife habitat to reduce waterfowl pollution were recommended by the California Department of Fish and Game, and can be accomplished at the time that Laguna Grande Park is developed.

2. Management of Septic Tank Systems

The AMBAG case study on water quality problems associated with septic systems emphasized the San Lorenzo Valley but, in most respects, was regionwide in scope. The AMBAG staff recognized that septic tanks and other "appropriate technology" for water quality management are receiving increasing technical and popular support, and are no longer viewed only as an expedient for waste treatment in rural or low-density developments "until sewers can be installed".

AMBAG staff identified four principal causes of septic system failure:

- Poor site evaluation;
- Poor design of the septic system;
- Poor septic tank construction practices; and
- Poor maintenance practices.

AMBAG staff noted an increasing awareness on the part of those concerned with septic system operations that cumulative effects, as well as the operation of single systems on single sites, were of great importance. It is being recognized increasingly that, in spite of the fact that systems might individually have appropriate site and other characteristics for safe operations, when the number of such systems in an area increases, the cumulative interactions lead to system failure.

In response to these problem areas, the staff recommended:

- Increased education and training programs (recognizing the widely different levels and types of skills needed by those responsible for the various aspects of septic tank operations -- skills ranging from post-graduate education in hydraulics and soil characteristics to training in septic tank maintenance procedures);

- Changes in septic system design requirements and installation of dual leach fields;

- Installation of risers to identify the location of septic systems and to facilitate inspections;

- Mandatory inspection and maintenance programs (either scheduled periodically or required at the time of sale of the property); and

- A continuation of public information programs of the type exemplified by AMBAG's recent information bulletin for homeowners on septic tank operation and maintenance.

An On-Site Wastewater Disposal Zone (OWDZ) was recommended as the governmental alternative to assure septic system maintenance in the San Lorenzo Valley and as the preferred alternative to be considered first in other areas of the AMBAG region. The OWDZ would be created by the San Lorenzo Valley County Water District in the case study area. As a general principle, initial preference would be given to existing special districts in other areas throughout the region, rather than attempting the more difficult and possibly unsuccessful alternative of requesting that the County create a series of OWDZs in all areas suitable for septic tanks.

An OWDZ is a recently empowered entity that can be created by any local government that is already empowered to acquire, construct, maintain or operate sanitary sewers or sewage systems. It can be established by resolution of the governing body of the implementing agency. The zone can be defined to include only areas where septic systems are appropriate. A determination is required from both the local health officer and the Regional Water Quality Control Board as to the number of on-site wastewater disposal systems that can be operated safely within the proposed zone, considering both individual and collective effects. It must be determined that the use of on-site disposal systems is not incompatible with applicable general plans or zoning ordinances. The OWDZ may enforce appropriate regulations for construction and maintenance and may abate improperly operated systems, with the costs becoming a lien against the property. A change may be made against the benefited property for operating the zone and maintaining on-site disposal systems.

The OWDZ is recommended as the preferred institutional alternative, because it clearly has the necessary power to assure efficient and safe operation of septic systems and to consider cumulative, as well as site-specific, effects. Of some importance, the zone can be a vehicle to determine and enforce the ultimate capacity of a planning area to use septic systems, rather than conventional collection and treatment facilities. The power of an OWDZ to determine areawide septic system capacity should be used in all instances where a city or county general plan visualizes some urbanization, but the capital improvements or facilities plan that accompanies the general plan does not call for the extension of sewers. An initial determination should be requested from both the appropriate health officer and the Regional Water Quality Control Board to determine the capacity that would be permitted at the time an OWDZ is formulated. This prior determination would prevent misconceptions on the parts of property owners about the density that might ultimately be permitted in a planning area.

It is also recommended that the health officer, in cooperation with the Regional Boards, establish and publish their guidelines, criteria and procedure for estimating the capacity of a planning area (i.e., a potential "zone" of an OWDZ) to use septic systems.

3. Control of Erosion and Sedimentation

Field investigations by AMBAG staff confirmed the existence of extensive erosion damage throughout the AMBAG region with resulting sedimentation in groundwater and lakes. A number of instances were noted where sedimentation problems resulted from public works projects, as well as from the action or inaction of private landowners. A total of 75 best management practices were identified as being suitable to prevent future erosion problems and to correct existing problems.

The basic institutional strategy to prevent future erosion problems in the region and to correct existing problems is that the cities and two counties adopt appropriate ordinances (or amend existing ordinances in the case of those jurisdictions that have already made significant progress towards controlling erosion) that would implement a series of regulatory principles. These principles would:

- Require prior public review of all proposals for grading activity, whether for agricultural or urban purposes;
- Provide for issuance of a grading permit based, in part, on a grading/erosion/sedimentation control plan;
- Take advantage of the advice and review of a designated Resource Conservation District on all grading proposals;
- Establish requirements for keeping livestock on small parcels of land that are not farms or ranches;
- Ensure that lands are developed in reasonable increments, which can be completed during a single construction season with scheduling to minimize the effects of rain on exposed soil;
- Require temporary control measures (both vegetative and structural) during development and construction activities;

- Require that each agency assign specially trained and experienced staff to plan and project review;

- Provide detailed grading standards and adequate temporary erosion control measures; and

- Utilize the technical standards of the U.S. Department of Agriculture Soil Conservation Service as an administrative guideline for erosion and sediment control ordinances and for agency public works activities.

The regulatory principles would be enacted in appropriate ordinances by the cities and the counties.

Two separate model ordinances -- a Grading/Erosion/Sedimentation Control Model Ordinance and a Cluster Development Model Ordinance -- were developed as part of the present project. These ordinances were provided by AMBAG as a technical service to its members and should not be a mandatory portion of the Section 208 plan or a required ordinance for local governments. Adoption of the regulatory principles would be required and use of the model ordinances would be encouraged, but each jurisdiction could formulate its own ordinance or adapt an existing ordinance, rather than take advantage of all or part of the model ordinances.

A specific intent of the overall erosion control strategy is that the requirements imposed on the private sector would also be accepted by the public works departments of the cities and counties. These agencies would also encourage other local governments and agencies responsible for major federal land holdings in the region (Fort Ord, the U.S. Forest Service, etc.) to use best management practices for erosion control.

A novel element of the erosion/sedimentation management strategy is that each city and county prepare a plan and program to correct erosion and sedimentation problems occurring at public works within their jurisdiction -- whether these public works were done by the city or county or done by another government agency. A plan and program for mitigating the effects of past practices should be prepared within two years and the program and financing schedule should be designed to correct recognized problems within 15 years. The city or county would be responsible for corrective action at its own projects and would encourage other local governments, the state and U.S. government agencies to correct any identified erosion or sedimentation problems over that same time period. Preparation of and adherence to this erosion/sedimentation correction program would be required by all relevant government agencies for compliance with the Section 208 plan.

There are no special institutional requirements or additional governmental powers required for the cities and the counties to enact appropriate ordinances and enforce their provisions.

As a supplement to the existing powers of local government to control erosion and sedimentation problems, it is recommended that the Regional Water Quality Board give greater priority to use of its existing powers to require abatement of sources of severe sedimentation problems.

The primary requirement for implementing the erosion/sedimentation control strategy -- in addition to a commitment toward this end by local government -- is availability of adequate training programs for all staff responsible for erosion and sedimentation control, including:

- Those who review or approve areawide sedimentation control plans;

- Those who review or approve grading plans; and

- Those who actually inspect for compliance with plans.

It is recognized that erosion/sedimentation control requires a great deal of experience and professional judgment. A number of management practices were identified, but selection of the set of practices that best fits a given situation requires both training and judgment. In fact, the current situation regarding availability of expertise produced an interesting institutional problem. AMBAG staff asserted that the reservoir of expertise, at the present time, resided primarily with the staffs of the U.S. Soil Conservation Service, their colleagues in the Resource Conservation Districts and the California Department of Transportation. The administrative responsibility for implementing and enforcing the erosion control measures, on the other hand would, under the recommended strategy, be located in city or county planning or building departments.

Consideration was given to the alternative of assigning "line" responsibility to the Resource Conservation Districts for implementing and monitoring erosion control procedures. This approach would weaken the Districts, in terms of their primary mission -- making their expertise available for technical assistance to rural and urban landowners -- if they were cast in a regulatory position. Instead, they can contribute to well-considered training programs that would be available to city and county staffs whose education and training requirements would range from those of senior-level administrators and technical advisors to field inspectors. Additional training resources are available as part of conventional career development programs, as part of the ongoing programs or potential special projects of community colleges, and at special training seminars sponsored by such agencies as the Monterey Bay Area Regional Training Center.

A financing plan for enacting and administering sedimentation control ordinances should be selected by each city or county. The two model ordinances provided for AMBAG eliminate the need for expensive independent efforts by each city and county. The costs of plan, review and inspections, once the ordinances are enacted, may be significant, but each jurisdiction has the options of:

- Determining that erosion control is a general governmental function and paying the additional costs from its General Fund; or
- Developing a schedule of fees or charges that would be collected from the developer and, to a great extent or totally, passed forward to the new property owner.

An important new source of financing available to those who must comply with erosion and sedimentation control requirements has been included in the Clean Water Act of 1977. Up to 50 percent of the total cost of an approved erosion management program will be available for grant funding. This federal program is to be administered by "...soil conservation districts, state soil and water conservation agencies or state water quality agencies..." and the Section 208 management agency must assure "...an adequate level of participation by owners and operators having control of rural land...."

Resource conservation districts are authorized to levy a tax rate of $0.02/$100 of assessed value on land only. It is recommended that districts not now levying their full tax rate consider increasing this rate to permit them to provide a greater level of technical assistance and education.

4. Nitrate Concentration in the Groundwater in the Salinas and Pajaro Valleys

Concentration of nitrates in the groundwater basins of the Pajaro and Salinas Valleys was the only case study that involved a direct hazard to life and health. The public health limit of 10 parts per million nitrate concentration was enacted to prevent a blood disorder called methemoglobinemia to which infants and small children are particularly susceptible.

Increasing nitrate concentrations have necessitated deepening or abandoning more than 70 domestic water supply wells in the

Salinas Valley, and other wells in both valleys are approaching the public health limit. The fact that the problem is becoming more prevalent does not, unfortunately, lead directly to agreement as to the source of the problem. Hypotheses and conclusions about sources of nitrate build-up -- particularly the assertion that nitrate concentrations were the result of agricultural practices -- was criticized severely, not only by the agricultural community, but by recognized experts in the relevant technical disciplines. To compound the uncertainty, it was noted that, in fact, concentrations in the groundwater that are being observed today may be the result of practices that have been discontinued more than a decade ago. With the passage of time, the nitrate build-up may reverse and diminish.

Institutional and fiscal alternatives were developed for a number of technical alternatives, including:

- Education on fertilizer and irrigation practices;
- Technical assistance programs for farmers to develop optimum irrigation/fertilization schedules;
- Requirements for metering the use of groundwater to provide an initial base of data about irrigation practices;
- Instituting a program of user charges for groundwater to encourage the use of water-conserving irrigation practices;
- Limiting the amount of water that could be applied to designated crops;
- Limiting the amount of nitrate fertilizer that would be permitted on designated crops and specifying recommended or mandatory fertilization practices;
- Requiring that feedlots and dairies collect solid wastes for remote disposal and collect liquid waste for evaporation; and
- Requiring that municipalities now using percolation ponds go to another form of disposal, such as wastewater irrigation.

The absence of a technical consensus as to the source of the nitrate concentrate problem led to a recommendation for a minimal institutional response. Emphasis, for the present, would be on education programs and on limited direct measures, such as:

- More aggressive monitoring and enforcement of regulations applicable to feedlots and dairies;

- Requiring the capping and sealing of abandoned wells — to be accomplished by county health officers -- and encouraging municipalities now using percolation ponds to consider other alternatives as part of their waste treatment planning programs.

The recommendation for specific programs of education to be undertaken by the Farm Advisors does not have direct cost implications. Interviews confirmed that programs in best management practices for fertilizer application and irrigation can be undertaken as part of established efforts. Nonetheless, if the two counties would provide modest local contributions on the order of $5,000 each to Cooperative Extension, this might well lead to a total contribution of effort by the local farm advisors' Cooperative Extension specialists that would be valued in the range of $50,000 to $100,000. This cooperative county/state effort would be used not only for education programs, but for operation of demonstration plots that would provide tangible evidence of ability to produce the same or greater yields with lessened applications of either fertilizer or irrigation water.

5. Control of Saltwater Intrusion

Intrusion of sea water into coastal aquifers is an increasingly severe problem, leading to salt concentrations that require wells from municipal supply and irrigation to be abandoned. The problem occurs as the watertable is lowered, because of:

- Increased use of groundwater for municipal and agricultural purposes; and
- Loss to urbanization of lands that serve the function of groundwater recharge.

Saltwater intrusion in the Pajaro Valley was used as a case study of measures to replace or reduce overdraft of the groundwater or to implement a physical barrier to sea water intrusion. The problem of preserving groundwater recharge areas was treated as a distinct case study.

Two alternatives were considered to solve the problem of groundwater use exceeding the amount of recharge. The first was a new source of water that could be imported into the Pajaro Valley, and the second was a water conservation program to reduce the amount of consumption. The leading alternative for a new source of water was identified as the U.S. Bureau of Reclamation's San Felipe project. Technical provisions have been made in the design of that project to allow for a water supply line to the study area, but a commitment has not yet been made by the U.S.

Bureau of Reclamation as to the quantity that could be supplied or the price of the water. Of some importance, the overall economic, fiscal and social impacts of a major new water source in Santa Cruz County -- including its growth-inducing impacts and its relationship to the policies for growth management that are now emerging in the county -- have not been analyzed. The immediate institutional response to this alternative should be a more detailed program of studies to assess total beneficial and adverse impacts of San Felipe water being delivered to the Pajaro Valley. A program for such a study is described subsequently.

In addition to the education program for efficient use of irrigation water that was described above, consideration was given to programs that could encourage conservation of water now used for municipal purposes. An ordinance for water conservation practices at new developments that could serve as a model for other local governments was recently enacted by Santa Cruz County. Further, there was adequate demonstration during the recent drought in northern California that significant reductions in the use of municipal water supplies could be achieved through education. Even greater reductions could be achieved through rationing programs. There exists adequate authority for each water quality agency to institute such measures, but it is not yet clear that homeowners or elected officials perceive this saltwater intrusion problem to be severe enough to require a water conservation program.

An alternative approach to water conservation was considered. The State Water Resources Control Board has an as-yet-unused authority to file a lawsuit leading to adjudication of rights to groundwater. The Board can ask the courts "...to restrict pumping, or to impose physical solutions, or both, to the extent necessary to prevent destruction of or irreparable injury to the quality of (ground) water." All claimants to the use of the affected water must be named as defendants in the suit. While such an adjudication may potentially be in the public interest, with the litigation for the public financed by the State of California, the results would be uncertain and the economic consequences of a successful court suit by the State cannot be predicted. The courts might, for example, mandate a significant reduction in water use, to the point that agricultural production would be reduced materially. With the alternative of a new source of water available for further study, there was not justification for a recommendation that a court suit be used to attempt a solution to the sea water intrusion problem.

A physical barrier to sea water intrusion was analyzed as part of the Santa Cruz County Wastewater Facility Plan. The preliminary estimate of total cost of an injection barrier (expressed as present worth rather than total dollars) was approximately $46,000,000. AMBAG should encourage further study, but total costs of this magnitude do not appear justified until the alternative of an additional water source has been explored thoroughly.

6. Protection of Groundwater Recharge Areas

Separate case studies were carried out by AMBAG staff and water quality consultants in the Pajaro Valley, the Carmel Valley and the San Lorenzo Valley regarding preservation of groundwater recharge areas. While the hydrologic and other characteristics of these areas differ widely, the implementation program was similar, calling for:

- Site-specific development standards and controls that would require that units be clustered away from areas of high recharge potential, limiting the amount of impervious surface, and providing an adequate drainage system; and
- General development regulations that would protect recharge areas that also had high open space values.

Cities and counties already have adequate planning and zoning powers to implement the strategies. The model ordinances that were prepared as part of the present assignment are useful as tools to preserve groundwater recharge areas in addition to their contribution to reduction of sediment and pollutant loadings.

7. Controlling Leachate Pollution from Sanitary Landfills

Landfill operations at Santa Cruz County's Buena Vista Solid Waste Disposal site and at the adjacent landfill facility operated by the City of Watsonville were investigated in detail by AMBAG's water quality consultant to determine the contribution of landfill operations to pollution of the groundwater and surface water. The investigation produced recommendations for a number of improved landfill operating practices, but implementation was well within both the authority and capability of the County of Santa Cruz and the City of Watsonville. The Regional Water Quality Control Board has both the authority and the responsibility to monitor the effects of landfill operations and to abate practices that lead to pollution. No revisions to institutional or financial arrangements were required.

C. Institutional and Fiscal Recommendations for the Regional Section 208 Plan

The overall implementation strategy for the Section 208 plan is to make organization arrangements, to adopt a program that can begin immediately to implement the recommendations from the case studies, and to move forward as quickly as possible to apply regionwide solutions.

1. The Organizational Concept

The organization to implement the Section 208 plan is built on a foundation of local governmental powers and local governmental technical abilities. Other government agencies contribute additional regulatory authority, technical assistance and a capacity to coordinate and evaluate the effectiveness of the 208 program.

In almost every instance, the entity that was identified during the case studies as having both the authority and the capacity to deal with the water quality problem was an existing local governmental agency. In the absence of evidence to the contrary during the implementation phases of the 208 program, local governments should continue to have the primary role in implementing both physical and regulatory solutions to nonpoint water quality problems.

It is recommended that local governments have broad discretion regarding the manner in which they implement regulatory policies. As discussed subsequently, it is recommended that the Section 208 plan require as a condition of compliance that the cities and the two counties adopt ordinances that enact the regulatory policies presented in the model ordinances on Grading/Erosion/Sedimentation and Cluster Development. This is by no means equivalent to a statement that local governments should adopt the model ordinances. As with the other aspects of implementation, the 208 plan should require a result, rather than specifying the exact method by which local governments will meet their responsibilities.

The existing regulatory authority of the health officers and the additional authority of the Regional Water Quality Control Board are essential to Section 208 program implementation.

Technical assistance at levels ranging from post-graduate education to one-day training seminars is essential to successful execution of the Section 208 program. Continuing education is the most basic element of the nitrate control program, and is essential to such other programs as erosion and sedimentation control and septic tank maintenance. The recommendations for technical assistance attempt to take advantage of the capabilities of all agencies that are available in the AMBAG region.

The role of coordinator and evaluator of the Section 208 plan should be assigned to the Association of Monterey Bay Area Governments. This role has two very different aspects. As a coordinator, AMBAG is facilitating the exchange of information between local governments, assuring that local governments realize the opportunities for efficiencies through joint action (e.g., a joint streetsweeping program) and assuring awareness of all opportunities for state and federal grant funding of steps required for implementation. As an evaluator, AMBAG would be in a much more demanding role. It would be charged with dealing, for example, with formulating the next strategy if, over time, the program of education was found not to lead to a reduction in nitrate concentrations of groundwater. Similarly, AMBAG would be charged with formulating a new plan, if the conclusion that local government has the capacity to implement the 208 program proves to be unfounded, in practice.

2. Implementing the Section 208 Water Quality Management Plan

The actual implementation strategies or actions that were recommended for use in implementing the Section 208 plan can be classified into five categories:

- Enacting ordinances that affect water quality;
- Constructing and operating public facilities;
- Enacting and enforcing liquid waste discharge standards;
- Conducting education programs; and
- Monitoring and evaluating various aspects of water quality.

As noted immediately above, the Section 208 plan requirement should be that regulatory policies -- not ordinances -- be mandated. Each city and county could take advantage of the model ordinances if they chose, but:

- Maximum flexibility in form and content of local ordinances is encouraged; and

- Policies that are inapplicable to circumstances in a particular jurisdiction should be excluded.

The institutional arrangements for constructing and operating public water quality facilities are either already established or are an appropriate subject for a local, rather than regional, decision. The case studies illustrated a number of practical alternatives, including:

- Joint exercise of powers agreements between established local governments;

- Use of special districts that are governed by elected officials of existing local governments; and

- Use of more autonomous special districts with appropriate powers.

There is no single institutional model for constructing or operating public facilities. Existing local governments, with the advice and concurrence of the appropriate Local Agency Formation Commission can establish the institutional mechanisms that are technically and fiscally appropriate and acceptable to the participants.

The AMBAG Section 208 plan should use regulations to control discharges from feedlots and dairies and to solve any groundwater quality problems from municipal treatment facilities. The Regional Water Quality Control Board has both the authority and the technical capability to assume responsibility for these aspects of the Section 208 plan.

One of the most important elements in Section 208 implementation is a thorough and continuing series of education programs in:

- Best agricultural practices to avoid excessive use of nitrate fertilizers or irrigation water, to limit the opportunity for nitrates to migrate to the groundwater; and

- Theory, practice and field inspection techniques related to administering the grading/erosion/sedimentation ordinances, the cluster development ordinances, and the septic system maintenance policies.

Adequate resources already exist to conduct these training programs countywide or cooperatively on a two-county basis using the resources of the Farm Advisor, the community colleges and the Monterey Bay Area Regional Training Center. Additional specialized resources available from the University of California Cooperative Extension, the State Water Resources Control Board, the State Department of Water Resources, the U.S. Geological Survey and other agencies should be involved where appropriate.

The monitoring and evaluation component of the Section 208 plan includes two separate functions: A program of technical studies and monitoring program, and a comprehensive effort to monitor the effectiveness with which an implemented Section 208 plan is meeting water quality objectives.

Planning and monitoring requirements include the following specific elements:

- Lake maintenance plans should be developed by the involved local governments for those lakes or water bodies that were not the subject of a case study during the initial Section 208 planning program. They should be completed within one year following adoption of the 208 plan.

- Recharge area preservation plans should be included in the conservation and open space elements of city or county general plans if they are absent, or should be revised if they are out of date. Consistent zoning or other techniques should be adopted to preserve recharge areas.

- A groundwater monitoring plan has been designed for the region by AMBAG's water quality consultant to attempt a long-term resolution of the controversy about the origin of nitrates in the groundwater and the urgency of action to solve the saltwater intrusion problem. (The cost of this monitoring program would be a fairly modest $20,000 additional per year.) The State Department of Water Resources is recommended as the lead agency with participation by the Monterey County Flood Control and Water Conservation District, the Santa Cruz County Flood Control and water Conservation District, the Santa Cruz County Watershed Manager's Office, and both County Environmental Health Departments.

- A comprehensive evaluation of water supply alternatives for groundwater recharge in the two counties should be completed under the leadership of a board of control. Participants in the effort should include all the local, state and federal agencies concerned with water supply in the two counties.

The second major element of the monitoring and evaluation program is that of monitoring for compliance with the Section 208 plan itself and determining whether the plan is effective in meeting water quality objectives. Responsibility for this effort should be assigned to AMBAG, and the specific responsibilities should include:

- Negotiating and updating as required joint work programs with the Regional Water Quality Control Board, the State Department of Water Resources and all other agencies carrying out further studies mandated by the Section 208 plan;

- Updating and maintaining population and land use projections and coordinating use of these projections in regional water quality, water supply, air quality, solid waste and transportation planning programs;

- Carrying out a continuing performance evaluation of the 208 plan, including an environmental, social and economic impact assessment;

- Preparing the annual revision of the Section 208 plan;
- Serving as an initiator or coordinator of grant applications and demonstration program applications related to water quality planning and nonpoint source pollution control; and
- Reviewing and commenting on the continued effectiveness of Section 208 implementation strategies including the effectiveness of the ordinances, regulations and management practices of local agencies.

3. Financing the Regionwide Section 208 Program

The continuing planning program mandated by the Section 208 legislation should be financed primarily by grants from the U.S. Environmental Protection Agency. The level of funding for federal support has not yet been established. Any reasonable forecast indicates that funds would be available to permit AMBAG to carry the responsibilities designated in the previous section. If this indication proves to be incorrect, the implementation schedule should be adjusted appropriately, since federal grant availability should be regarded as a precondition for plan implementation.

It is recommended that AMBAG's responsibilities be carried out using staff resources equivalent to 2.5 person-years per year, with an approximate total cost of $80,000. It is recommended that planning and monitoring for compliance and effectiveness be the responsibility not of a separate staff, but of AMBAG per se, with staff assignments made on the basis of the requirements of a particular issue and the availability of staff resources. By including Section 208 planning and monitoring functions as part of the overall AMBAG program, there is greater opportunity to bring comprehensive planning considerations to bear on water quality issues.

The recommended 2.5 person-year equivalent is in addition to staff or contributed services that may be available from other agencies. AMBAG should continue its program of aggressively seeking participation from federal, state and local governments in the Section 208 program.

The $20,000 local share implied by an $80,000 total cost of plan maintenance and monitoring should be treated as a "general fund" item in AMBAG's annual budget.

It is recommended that the major technical elements in the Section 208 plan be financed as follows.

- Development and enforcement of ordinances related to water quality control should be financed at the discretion of each local government. General Fund revenues could be used, or the cost of developing and enforcing ordinances could be recovered by use of development or permit fees.

- Management practices implemented by agriculturalists may be eligible for grants of up to 50 percent under the terms of the Clean Water Act of 1977.

- The "facilities-oriented" implementation measures are eligible for one or another of the grant programs of the U.S. Environmental Protection Agency, including the Wastewater Facilities Grant program, the Section 208 implementation program and the Clean Lakes program.

- Regulation of liquid waste discharges would be primarily the responsibility of the Regional Water Quality Control Board, and can be funded from the annual budget of that state agency.

- The education programs, although they are one of the most basic underpinnings of the Section 208 program, have only modest fiscal requirements. The County Farm Advisors are able to accomplish the training programs on fertilizing and irrigation practices with the existing resources, and the programs in soil management practices can be continued as part of existing professional education programs. It is recommended that an additional contribution of $5,000 from each county be offered to the University of California Cooperative Extension as an incentive to make significant technical resources available for demonstration projects.

- The groundwater monitoring program, with an identified additional cost of $20,000 per year, should be funded, if possible, by the California Department of Water Resources. Failing that, AMBAG can negotiate with the agencies already involved in groundwater monitoring to determine whether the additional effort can be financed by them.

- The recommended source of financing for the comprehensive evaluation of water supply for groundwater recharge is $25,000 from the ongoing Section 208 planning funds and $30,000 in cash or services from the agencies participating in the study.

A final and overriding recommendation on financing is that AMBAG continue its efforts to identify and secure all available federal and state grant or demonstration programs.

A proposed initiative to limit the amount of property taxes that can be collected by local governments will be accepted or rejected by California's voters in June 1978. If this initiative -- which would limit property tax collections in total to approximately one-third of current levies -- is adopted, those portions of the Section 208 Financing Plan that depend on local general fund expenditures would be delayed or possibly eliminated. All of the plan elements that depend on a local expenditure to match a portion of a federal grant are in this category. Section 208 Plan elements that depend on user charges (e.g., the use of on-site wastewater disposal zones for septic system maintenance or on developer/homeowner fees) would not be affected.

II. SCOPE AND PURPOSE OF THE INSTITUTIONAL/FISCAL ANALYSIS

Solutions to water quality management problems in Santa Cruz and Monterey Counties have traditionally depended on "physical" or "structural" techniques, such as collector systems and treatment plants. The Association of Monterey Bay Area Governments (AMBAG) and other designated 208 planning agencies in the United States have increasingly turned towards nonstructural solutions to supplement the traditional approaches to water quality management. Nonstructural solutions depend on the wide range of techniques conveniently classified as "Best Management Practices" (BMPs) that tend to remove or control the sources of pollutants before they actually occur. Examples of BMPs are development standards to reduce run-off, water conservation techniques, suggested or mandated farming practices to reduce pollutant loads, more frequent or thorough sweeping of paved streets and roads to remove pollutants, etc.

Whether a solution to a water quality management problem is structural in nature or involves regulation or other best management practices, consideration must be given to the requirements for successful implementation. It is appropriate to consider:

- The agency, whether governmental or private, that will operate or manage a structural solution or be responsible for a nonstructural solution; and
- The fiscal burden of the water quality management practice -- what is the cost and who will finally pay the cost?

The AMBAG 208 program considered the question of which institution should be responsible for a water quality management technique and how any public or private costs would be financed. Throughout this report, the term "institutional/fiscal" is used to refer to the forms of government organization, intergovernmental cooperation, government/private sector arrangements and legislative techniques that can be used to implement the recommendations of the Section 208 Water Quality Management Plan. The term also includes consideration of financing techniques and fiscal burden that is associated with water quality programs. The term "institutional/fiscal" is distinct from the "management" techniques included in the notation "best management practice" for water quality.

A. The Case Study Approach

The study design for the entire AMBAG 208 Water Quality Management Program depended heavily on the case study -- the detailed analysis of a single water quality problem in a single area, or in a limited number of areas with similar characteristics. Faced with a limited time schedule and budget, AMBAG selected an approach that would permit it to deal in depth with specific problems, rather than deal at an unsatisfactorily general level with the same problem, considering all of the nuances and ramifications of differences throughout the entire two-county region. The underlying concept was that the effort would produce practical, well-researched solutions to the case studies, as well, insofar as possible, as offering a basis for generalizations that might be applicable throughout the region.

The institutional/fiscal study follows the case study approach. First, the institutional and fiscal alternatives are considered for each of the case studies, and a recommendation of one or more institutional/fiscal arrangements is made for that case study. A separate -- and possibly different -- recommendation may be recommended as a regionwide solution. It should be understood carefully that the institutional/fiscal recommendation for an individual case study may not be applicable "across the board" in both Santa Cruz and Monterey Counties. Similarly, the recommended regional solution may not in every instance be the one that is best capable of implementing a solution to the problems identified in an individual case study.

The separation of localized and regional governmental mechamisms was deliberate. Certain of the case study solutions could be implemented immediately, while a regionwide approach might -- in some cases, quite appropriately -- be years away. The case study solutions were selected as being most suitable for the individual circumstance included in the case, and were selected to be feasible immediately.

B. Criteria for Selecting an Institutional/Fiscal Arrangement

The first and overriding consideration in the evaluation of institutional/fiscal alternatives was that of selecting the arrangement that best suited the circumstances at hand -- whether that be the circumstances of an individual case study or the range of circumstances that might be encountered if a countywide or a regionwide solution were implemented. A number of additional criteria guided the recommendations that are contained in the following sections. They related first to the capabilities of institutions that exist in the County, and second, to more general principles of government organization and public finance.

1. The Inventory of Available Institutions

AMBAG has prepared a detailed report (1) listing the various public agencies in the two-county area whose activities are, or could be, related to water quality management. The analysis covers legislative authority and current use of that authority, including programs, regulations, financing, expansion plans and current issues or problems. The AMBAG report also considers the ways in which the existing governmental structure as a whole may constrain the planning and implementation of a water quality management program.

It is assumed that any water quality management program will have four components -- planning, operations, regulatory activities and financial support -- which, in turn, will be applied to three subject areas -- water quality, water supply and land use. Each existing agency was evaluated according to its ability to perform these four components. Certain problem areas or inadequacies were found to be common to many agencies.

- Planning. Problems include lack of data concerning the incremental effects of land use decisions on water quality; limited authority or concern with respect to nonpoint sources; water supply planning separated from water quality planning and nonpoint source pollution control from point source control; and nonconformance of the boundaries of land use planning jurisdictions with the boundaries of water resource planning areas.

- Operations. There is a general absence of capital improvement programs for controlling nonpoint sources; and lack of coordination between land use planning agencies and special district service agencies.

- Regulation. Development regulations affecting water quality are not applied uniformly within watersheds; other water-related policies are vague or inconsistent within the same watershed; authority of state and federal agencies overlap and compete; and available powers may not be fully used.

- Financial. There is a general lack of funds for nonpoint source control. Assessment practices penalize landowners who install pollution control improvements.

The AMBAG report concludes that the institutional arrangements that are part of the 208 program must be intergovernmental in nature and must be cost-effective.

The inventory and analysis have been useful starting points in assessing the capability of existing institutions, keeping in mind that their capability may go substantially beyond what they are now doing. Many, if not most, of the above inadequacies can be overcome by fuller use of existing authority to collect data, plan, adopt regulatory programs, coordinate with other agencies, enter into joint powers agreements and raise funds.

2. Criteria for Evaluating Institutional/Fiscal Alternatives

When institutional alternatives were evaluated, fuller uses of existing authority were considered first. Only where institutional change -- that is, the modification of existing institutions or the addition of new institutions -- had a very clear advantage over the expanded capability of existing institutions, has it been included as a recommended alternative. While preference was given to existing institutions or combinations of institutions, an evaluation of new institutions or new institutional arrangements was not limited by a premature concern about "proliferation of governments". It was fairly clear from the outset that truly major government reorganization would not be needed to implement the 208 program. It was also concluded that, in some instances, the creation of a new governmental organization in fact meant "less government" rather than "more government". The boundaries of a new entity could be tailored to the boundaries of the problem area, rather than imposing taxes or requirements for compliance on businesses and homeowners that were outside of the problem area, but happened to be within the boundaries of an available jurisdiction. Further, new special districts often represent "new governments" in name only. The governing body would consist of locally elected officials of general governments who are already holding office, and staff support would be available from existing local governments. The new district would merely permit a focusing of effort within the boundaries of the problem area.

The following major criteria were developed and applied to the institutional/fiscal alternatives. The same criteria were applied to existing institutions, modifications (e.g., joint powers agreements) and new institutions.

- Authority. Is the agency currently authorized to conduct the necessary planning, public service delivery, facility implementation, or regulation for the proposed water quality management techniques? Does case law support use of this type of agency for regulatory purposes? Can the agency impose sanctions, legally, for noncompliance?

- Consistency with Goals, Objectives and Policies. Would the proposed management techniques and agencies provide regional or local water quality management which conforms to other public goals, objectives and policies?

- Geographic Coverage. Are the jurisdictional boundaries of the institution suited to the area over which implementation should take place? Do the boundaries exclude taxpayers who would not be benefited by a solution to the water quality problem?

- Financing Powers. What type of financing power does the agency have for funding the local share of water quality management costs? Does it have *ad valorem* taxation power? If so, what are the limits on the tax rates and use of the revenues? Can the agency levy service charges, stand-by charges, connection charges, assessments or development fees, etc.? What types of debt are permissible, what are the limits and procedures of that debt capacity? Can subdistricts be formulated to levy property tax or retire debt?

- Fiscal Implications. What effect will the proposed agency and its financing requirements have on the tax base of other public agencies and on their implementation of adopted capital improvement programs? Will it affect their future financing capability? Do service or tax inequities arise from inequitable or counterproductive or redundant provisions of public services?

- Economic Implications. Does the proposed management technique affect economic development currently projected in regional and local plans? Will it affect the location of future economic activity and employment?

- Governance. Is the institution's governing body likely to be responsive to the implementation requirements and accountable to the public that is affected? Do the members of the governing body have perspective and concern for a range of governmental issues, or is their area of responsibility limited to one or a few special functions?

- Administrative and Technical Capability. Does the agency possess the requisite technical skills to implement the program? Does the agency have proven capability to manage the program at acceptable cost? Can the agency be both effective and efficient? Is the staff skilled in implementing the proposed management technique? Does the agency have the capability for financial control? If federal or state grants or loans are to be utilized in financing compliance costs, can the agency exercise adequate control over disbursement of such funds? Does the agency have the capacity to administer a system of user charges, if applicable?

- Ease of Implementation. If current statutory authority is inadequate for a proposed management technique, what is

> required to modify the mandate of an existing agency or create a new agency? Is an election required? What agency approval is required? What are the SB90 issues? How certain is implementation, given existing perceptions of elected officials, public administrators and the public? Can the proposed approach generate sufficient political support to offer a high probability of successful implementation?

The criteria were selected after careful consideration of the requirements of the U.S. Environmental Protection Agency (EPA) for regulatory approaches to nonpoint source pollution control (20).

A final overriding criterion gave preference to governance by officials of general-purpose governments (cities and counties), in contrast to limited-function, special-purpose governments. This did not necessarily mean a preference for cities or counties, compared to special districts, since there are a number of alternative forms of special districts, in which the governing body consists of elected officials from general-purpose governments.

III. THE LAGUNA GRANDE/ROBERTS LAKE CASE STUDY

Laguna Grande and Roberts Lake are two small, closely related lakes, located very near the coast on the border between the cities of Seaside and Monterey. They are both threatened with severe water quality and sedimentation problems -- to the extent that Roberts Lake, in particular, would be expected to fill in completely if no mitigation measures are taken. The water quality problems at these lakes are so extensive that they are nearly representative of all the water bodies in the AMBAG region, avoiding only the problems of saltwater intrusion, pollution from septic tanks and agricultural run-off. In addition, the institutional setting of Laguna Grande is quite complex, involving three incorporated cities, the County, special districts, a Joint Powers Authority and Fort Ord. They were selected as case studies to be representative of the technical and institutional problems that would be encountered at water bodies throughout the two Counties.

A. Pollution Problems and Technical Solutions

There are a considerable number of technical responses to the pollution problems of Laguna Grande/Roberts Lake and a number of institutional/fiscal means to implement these technical responses. The pollution problems and alternative technical responses are summarized below, as a prelude to an analysis of the institutional alternatives.

Laguna Grande and Roberts Lake are already suffering significant water quality problems because of the pollution loads that have accumulated in the lakes from street run-off, erosion, and, in the case of Roberts Lake, windblown sands. Depths in the lakes have been reduced to an average of two to three feet, reducing their value as recreation resources and wildlife habitats. Negative impacts on Laguna Grande as a recreation resource are particularly significant, since this area has recently been acquired as a regional park by the Monterey Peninsula Regional Park District. Physical solutions to pollution in the lakes include both the correction of the effects of sediment that has collected in the past and the reduction of pollution reaching the lake (11).

Four mutually supporting physical solutions to existing pollutant loads in the lake were evaluated by AMBAG staff.

Dredging Roberts Lake by two additional feet and Laguna Grande by four feet would increase the volume of the lakes, permitting better dilution of incoming pollutants, as well as removing existing pollutants. The depth of dredging is limited, because additional dredging might permit intrusion of saltwater into the lakes.

Disposal of the dredged material could be accomplished either by spreading it throughout the proposed Laguna Grande Regional Park (although care would be needed during the park planning program to avoid erosion of sediment or percolation of irrigation water back into the lake) or disposal at the Marina Landfill. Total cost of dredging both lakes (with disposal at the park site) would be approximately $450,000. Even with the control measures described subsequently, additional pollutant loadings to the lakes would require maintenance dredging in from 30 to 50 years.

Bentonite sealing was recommended as a means to prevent the sediments that would remain in Laguna Grande after the dredging from polluting the lake water. Effectiveness of this measure is reduced if new sediments are deposited on top of the bentonite seal. Thus, unless the programs (described subsequently) to reduce future pollutant loads are carried out, the effectiveness of the seal would be lost in a few years. The cost of the bentonite sealing for Laguna Grande would be approximately $12,000.

Water level increase at Roberts Lake could be accomplished by replacing the outlet culvert of the lake with stoplogs that would raise the normal lake level by 1.5 feet. The stoplogs could be removed during times of major flooding to maintain the Lake's flood protection capacity. The effect of the increased water elevation would be equivalent to that of dredging the lake -- the additional volume would permit greater dilution of incoming pollutants. The cost of installing the stoplogs would be less than $5,000.

Aeration of both Laguna Grande and Roberts Lake would help in keeping the lake aerobic, and would hasten decomposition of organic materials, add to the supply of dissolved oxygen needed by lake organisms, prevent hydrogen sulfide production through anaerobic decompositions, and would have an effect on the color of the algae that would be produced. The cost of aeration equipment would be approximately $6,000, with annual operation and maintenance costs of $600.

The programs to reduce existing and future pollution loadings for Laguna Grande and Roberts Lake include:

- Improving the quality of existing and future street run-off -- the source of nearly two-thirds of the sediment loads at Laguna Grande -- by instituting a vacuum streetsweeping program in all upstream areas. Additional programs include enacting a requirement that catch basins to permit removal of pollutants from stormwater be installed at all new projects, and requiring that existing dirt pavements and driveways be paved or otherwise treated to limit erosion.

- Mitigating the adverse impacts of existing upstream erosion by installing a sediment trap either at Work Memorial Park in the city of Del Rey Oaks, or at the inlet to Laguna Grande. The latter alternative is more expensive and less effective, but does not impact on Work Memorial Park and simplifies institutional arrangements.

- Mitigating adverse effects of existing public works projects in the watershed.

- Mitigating adverse effects of future upstream development by enacting ordinances that require on-site retention of stormwater, or that require development plan standards (e.g., cluster development, revised road widths and grading standards, erosion control standards) that will reduce the sources of sediment. Enforcement and effectiveness of regulations could also be considered as part of the process of reviewing environmental impact reports.

- Reducing the amount of windblown sands that are arriving at Roberts Lake, either by stabilizing the nearby sand dunes with plantings, screenings or other vegetation programs or, alternatively, by increasing the dredging frequency for Roberts Lake.

- Reducing the amounts of pollutants contributed by waterfowl to Laguna Grande -- a relatively insignificant factor now, but one of increasing significance if the other recommended pollution control techniques reduce nitrogen and phosphorus loads significantly -- by instituting a waterfowl and aquatic vegetation management program that would discourage use of Laguna Grande as a wildlife habitat and establish a new habitat at Roberts Lake.

- Reducing the adverse effects of park development, maintenance and use at Laguna Grande by enforcing high standards of development, maintenance and refuse collection.

To a large extent, the measures to reduce loadings from existing and future pollution sources are mutually self-supporting.

B. Institutional Alternatives

The Laguna Grande/Roberts Lake case study was particularly appropriate because of the complexity of the existing or potential intergovernmental arrangements. The physical solutions to water quality problems involve conventional public works (e.g., dredging, sediment traps), revised standards for public facilities (e.g., roadway standards and grading standards) and regulations on private development (e.g., on-site stormwater retention requirements, cluster development standards). Total costs of the physical solutions are not extremely high, but they are significant, and some of them (e.g., development standards and paving requirements for existing driveways) would be borne directly by the new or existing property owners.

The lakes themselves are in incorporated areas, but the watershed that contributes to the pollution problem is partially within the jurisdictions of the cities of Monterey, Seaside and Del Rey Oaks, and partially within Monterey County's unincorporated area. The U.S. Army's Fort Ord controls, and is independently responsible for, a portion of the watershed. If a major annexation and development project -- the "Monterey II" project -- is carried out, all of the County's lands in the watershed are likely to be annexed to the City of Monterey. Finally, an existing Joint Powers Authority (JPA) has been established to acquire Laguna Grande for a park. Members of the JPA are currently the Cities of Monterey and Seaside and the Monterey Peninsula Regional Park District.

The combination of physical solutions to the pollution problem and existing or potential institutional arrangements led to a very large number of institutional alternatives for Laguna Grande and Roberts Lake. These alternatives are summarized in Tables III-1 through III-7. In many instances, Tables III-1 through III-7 show alternatives that differ only in terms of the agency or agencies responsible for implementing the physical solution.

The following considerations guided the development of the alternatives.

- The responsible public agency should have adequate powers to operate and finance the physical solution.
- The agency should have adequate powers or other means to assure coordination with general-purpose governments (a point discussed further subsequently), and should have enough permanence to withstand short-term instances where one involved government agency was not in agreement with another as to some issue affecting Laguna Grande or Roberts Lake.
- The agency should have the capacity to assign the costs of physical solutions that involve public works (e.g., dredging, construction and maintenance of the sediment trap) to

Table III-1

SUMMARY OF INSTITUTIONAL/FISCAL ALTERNATIVES - IMPROVED PHYSICAL CONDITION OF LAGUNA GRANDE/ROBERTS LAKE

Case Study Area: Laguna Grande/Roberts Lake

General Issue: Sediment and nutrients from upstream urban land uses are the primary contributors to the low water quality in the lakes.
Specific Issue: Improve the existing physical conditions of the lakes.

Alternative	Techniques	Implementation Action Needed	Estimate of Total Cost (Public & Private) Capital	Operation & Maintenance	Who Bears the Cost?	Potential Nonlocal Funding Sources	Responsible Public Agency	Public Agency Staffing Needs	Effect on Other Public Agencies	Comments
1	Dredge Laguna Grande and Roberts Lake	Contract for dredging services.	$320,000 Laguna Grande $130,000 Roberts Lake	--	Monterey Peninsula Regional Park District bears cost for Laguna Grande, City of Seaside bears cost for Roberts Lake.	Clean Lakes Grant, US EPA.	Monterey Peninsula Regional Park District and City of Seaside.	None	Change in lake characteristics may affect actions of N. Salinas Valley Mosquito Abatement District.	
2	(Same)	(Same)	(Same)		(Same)	(Same)	Joint Powers Authority, including Del Rey Oaks, Monterey, Seaside, the County and the Regional Park District.	(Same)	(Same)	
3	(Same)	Form a sanitation district including all upstream areas and contract for dredging services.	(Same)		Cost is allocated to land and improvements in entire area in proportion to real property value.	(Same)	A newly created sanitation district.	None, per se. Staff would be involved in implementing other techniques.	(Same)	Taxing of Fort Ord watershed property is not possible.
4	Seal the bottom of Laguna Grande	Install a bentonite sealing layer on the bottom of Laguna Grande.	$ 12,000	--	Regional Park District	Clean Lakes Grant, US EPA.	Regional Park District.	None	Change in recharge characteristics may affect local water agencies.	

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[1] In practice, the sanitation district option would not be considered if this technique were the only management improvement to be implemented.

Table III-1 (Continued)

Case Study Area: Laguna Grande/Roberts Lake

General Issue: Sediment and nutrients from upstream urban land uses are the primary contributors to the low water quality in the lakes.
Specific Issue: Improve the existing physical condition of the lakes.

Alternative	Techniques	Implementation Action Needed	Estimate of Total Cost (Public & Private) Capital	Estimate of Total Cost (Public & Private) Operation & Maintenance	Who Bears the Cost?	Potential Nonlocal Funding Sources	Responsible Public Agency	Public Agency Staffing Needs	Effect on Other Public Agencies	Comments
5	(Same)	(Same)	(Same)		Cost is allocated to land and improvements in entire area in proportion to real property value.	(Same)	A newly created sanitation district.[2]	(Same)	(Same)	
6	Change outlet height in Roberts Lake to allow greater volume except under flood conditions.	Install stop logs at the outlet culvert at Roberts Lake.	$5,000	Nominal	City of Seaside	None	City of Seaside	None	None	
7	Increase dissolved oxygen supply in the Laguna Grande and Roberts Lakes.	Aerate Laguna Grande/Roberts Lake.	$6,000	$600	Regional Park District	Clean Lakes Grant, US EPA	Joint Powers Authority, including Del Rey Oaks, Monterey Seaside, the County and the Regional Park District.	None	Operations of Seaside Parks Department may be affected.	
8	Increase dissolved oxygen supply in Laguna Grande only.	Aerate Laguna Grande.	$3,000	$300	Regional Park District	(Same)	Regional Park District	(Same)	None	
9	Increase dissolved oxygen supply in Roberts Lake only.	Aerate Roberts Lake	$3,000	$300	City of Seaside	(Same)	City of Seaside	(Same)	None	
10	Increase dissolved oxygen supply in the Laguna Grande/Roberts Lake.	Form a sanitation district including all upstream and downstream areas and aerate Laguna Grande/Robert Lake.[2]	$6,000	$600	Cost is borne in proportion to real property value throughout the district.	Clean Lake Grant, US EPA.	Newly formed sanitation district.	(Same)	(Same)	

Table III-2

SUMMARY OF INSTITUTIONAL/FISCAL ALTERNATIVES - IMPROVED QUALITY OF STREET RUN-OFF

Case Study Area: Laguna Grande/Roberts Lake

General Issue: Sediment and nutrients from upstream urban land uses are the primary contributors to the low water quality in the lakes.
Specific Issue: Improve the quality of existing and future street runoff.

Alternative	Techniques	Implementation Action Needed	Estimate of Total Cost (Public & Private)		Who Bears the Cost?	Potential Nonlocal Funding Sources	Responsible Public Agency	Public Agency Staffing Needs	Effect on Other Public Agencies	Comments
			Capital	Operation & Maintenance						
1	Vacuum sweeping of all upstream areas	Voluntary cooperation of local agencies	$ 20,000[1]	0[1]	Each agency bears the cost in its own jurisdiction. Equipment sharing is possible.	None	No definite overall responsibility	A total of 2or 3 sweepers and crews by 1995.	None	
2	(Same)	Sweeping is accomplished under the terms of a joint exercise of powers agreement.	(Same)		(Same.) Conceivably, some alternative cost sharing method could be negotiated as part of the joint exercise of powers agreement.	(Same)	The Joint Powers Authority established under the agreement. Participants would include Del Rey Oaks, Monterey, Seaside and possibly Monterey County.	(Same)	(Same)	
3	(Same)	A sanitation district including all upstream areas is formed, and is responsible for streetsweeping.[2]	(Same)		In the absence of a user charge, the costs will be borne in proportion to the real property value from the cities and the county, within the boundaries of the sanitation district.	(Same)	A newly created sanitation district.	(Same)	(Same)	

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[1] This amount is the incremental cost to purchase a vacuum-type sweeper instead of a conventional sweeper. Actual purchase price is $55,000. No change in operating and maintenance cost from conventional to vacuum sweeper.

[2] In practice, the sanitation district option would not be considered if this technique were the only management improvement to be implemented.

Table III-2 (Continued)

Case Study Area: Laguna Grande/Roberts Lake

General Issue: Sediment and nutrients from upstream urban land uses are the primary contributors to the low water quality in the lakes.
Specific Issue: Improve the quality of existing and future street runoff.

Alternative	Techniques	Implementation Action Needed	Estimate of Total Cost (Public & Private)		Who Bears the Cost?	Potential Nonlocal Funding Sources	Responsible Public Agency	Public Agency Staffing Needs	Effect on Other Public Agencies	Comments
			Capital	Operation & Maintenance						
4	Install catch basins at new projects.	Enact development regulations that require removal of pollutants from stormwater.	$1,000 per catch basin	$50 per year per basin	Buyers of new houses in the drainage area. All public agencies with construction projects in watershed.	N.A.	Cities and the County.	None	Possibly CALTRANS and Airport District.	Non-conforming actions by Fort Ord could limit effectiveness.
	(Same)	(Same.) Establish a sanitation district to enact regulations.	(Same)		(Same)	(Same)	The newly formed sanitation district.	One enforcement officer.	(Same)	(Same)
	Eliminate sediment and erosion from unpaved dirt driveways.	Enact an ordinance requiring that dirt driveways be paved. Establish a special assessment district to provide 10-year financing for this requirement.[1]	Determined by owners' design preferences.		Homeowner	None	Cities of Del Rey Oaks, Seaside, Monterey and Monterey County.	None	None	

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[1] Homeowner would have the option to pave his/her driveway privately.

Table III-3

SUMMARY OF INSTITUTIONAL/FISCAL ALTERNATIVES - CONTROL ADVERSE EFFECTS OF EXISTING UPSTREAM EROSION

Case Study Area: Laguna Grande/Roberts Lake

General Issue: Sediment and nutrients from upstream urban land uses are the primary contributors to the low water quality in the lakes.
Specific Issue: Mitigate adverse effects of existing upstream erosion. NOTE: Vacuum streetsweeping also applies to this issue.

Alternative	Techniques	Implementation Action Needed	Estimate of Total Cost (Public & Private)		Who Bears the Cost?	Potential Nonlocal Funding Sources	Responsible Public Agency	Public Agency Staffing Needs	Effect on Other Public Agencies	Comments
			Capital	Operation & Maintenance						
1	Install sediment trap at Del Rey Oaks.	Establish a Joint Powers Authority and construct the sediment trap.	$150,000	$ 5,000	Cost-sharing to be negotiated.	Clean Lakes Grant, US EPA.	Joint Powers Authority, including cities of Del Rey Oaks, Monterey, and Seaside; County of Monterey and the Regional Park District.	None	None	
2	(Same)	Form a sanitation district including all upstream areas and construct the sediment trap.	(Same)		Cost is allocated to land and improvements in entire area in proportion to real property value.	(Same)	A newly created sanitation district.	(Same)	(Same)	
3	Install sediment trap in Laguna Grande.	Establish a Joint Powers Authority and construct the sediment trap.	$260,000	$5,000	Cost sharing to be negotiated.	(Same)	Joint Powers Authority, including cities of Del Rey Oaks, Monterey, and Seaside; County of Monterey and the Regional Park District.	None	None	
4	(Same)	Form a sanitation district including all upstream and downstream areas and construct the sediment trap.	(Same)		Cost is allocated to land and improvements in entire area in proportion to assessed value.	(Same)	A newly created sanitation district.	(Same)	(Same)	

Table III-4

SUMMARY OF INSTITUTIONAL/FISCAL ALTERNATIVES -
CONTROL ADVERSE EFFECTS OF FUTURE UPSTREAM DEVELOPMENT

General Issue: Sediment and nutrients from upstream urban land uses are the primary contributors to the low water quality in the lakes.
Specific Issue: Mitigate adverse effects of future upstream development.

Alternative	Techniques	Implementation Action Needed	Estimate of Total Cost (Public & Private)		Who Bears the Cost?	Potential Nonlocal Funding Sources	Responsible Public Agency	Public Agency Staffing Needs	Effect on Other Public Agencies	Comments
			Capital	Operation & Maintenance						
1	Consider erosion and sedimentation as part of the EIR process.	Enact specific guidelines controlling the extent to which Initial Studies and Environmental Impact Reports will consider sedimentation and erosion; and mitigation measures for these effects.	Incremental costs will be nominal.		New homeowner or new owner of commercial facilities.	None	Each affected city and the County.	None	Possibly CALTRANS (Hwy 68) and Monterey Peninsula Airport District	Non-conforming actions by Fort Ord may limit effectiveness. Expertise of Resource Conservation Districts would be useful; modification of RCD boundaries to include watershed should be considered.
2	Retain stormwater on-site in new developments.	Enact ordinances requiring on-site stormwater retention.	Minimal public cost	$25,000 for administration	Buyers of new houses in the drainage area bear the facilities cost.	None	City of Monterey and Monterey County (for the unincorporated areas).[1]	A total of one additional building inspector.[2]	Mosquito Abatement District, depending on type of retention measures used.	(Same)
3	(Same)	(Same)	(Same)		(Same)	(Same)	A zone of the County Flood Control District that covers the drainage basin.	(Same)	(Same)	(Same)
4	(Same)	A sanitation district including all upstream areas is formed and is responsible for drainage regulation.	(Same)		(Same)	(Same)	Newly formed sanitation district.	(Same)	(Same)	(Same)
5	Establish development layout standards to minimize runoff.	Enact planned unit development ordinances to provide for cluster development. Revise road width standards.	Minimal public cost	$12,500 for administration	Unable to determine since costs are dependent on site conditions/local agency infrastructure provision policies.	N.A.	Each city, and the County for unincorporated areas.	One additional planner in the City of Monterey (0.5 person-years in the County if the area does not annex).	None	(Same)

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[1] Cities of Del Rey Oaks and Seaside might be involved, depending on the extent of development or redevelopment in these jurisdictions.

[2] Depending on workload and other responsibilities, one inspector might have to be added in both the City and the County. These staff additions could be expected whether or not the stormwater retention requirement is adopted.

Table III-5

SUMMARY OF INSTITUTIONAL/FISCAL ALTERNATIVES
CONTROL FILLING OF ROBERTS LAKE BY WINDBLOWN SANDS

Case Study Area: Laguna Grande/Roberts Lake

General Issue: Sediment and nutrients from upstream urban land uses are the primary contributors to the low water quality in the lakes.
Specific Issue: Control filling of Roberts Lake by windblown sands.

Alternative	Techniques	Implementation Action Needed	Estimate of Total Cost (Public & Private) Capital	Operation & Maintenance	Who Bears the Cost?	Potential Nonlocal Funding Sources	Responsible Public Agency	Public Agency Staffing Needs	Effect on Other Public Agencies	Comments
1	Stabilize the sand dunes with planting, etc.	Implement planting, screening or other preventative program.	$27,000	$2,000	The State of California	N.A.	State of California, Department of Parks and Recreation.	None	CALTRANS (Hwy. 1)	State Parks Dept. responsibility assumes State purchase of beach parcel.
2	Increase the frequency of dredging.	Contract for dredging.	$75,000 every 6 years.		City of Seaside	Clean Lakes Program, US EPA.	City of Seaside	None	None	

Table III-6

SUMMARY OF INSTITUTIONAL/FISCAL ALTERNATIVES - WATERFOWL CONTROL AT LAGUNA GRANDE

General Issue: Sediment and nutrients from upstream urban land uses are the primary contributors to the low water quality in the lakes.
Specific Issue: Waterfowl contribute small relative amounts of nitrogen and phosphorus to Laguna Grande, but if the other recommended techniques were implemented (an total contribution of nitrogen and phosphorus were reduced significantly, then waterfowl would become a significant contributor.

1	Institute waterfowl and aquatic vegetation management.	Construct various structural improvements to establish a new wildlife habitat in Roberts Lake and remove habitat and otherwise discourage use of Laguna Grande.	(Forthcoming)		Regional Park District.	Technical assistance is provided by California Department of Fish and Game.	Regional Park District.	None	Continued liaison with the State Department of Fish and Game should be maintained. Efforts by N. Salinas Valley Mosquito Abatement District will be affected.	

Table III-7

SUMMARY OF INSTITUTIONAL/FISCAL ALTERNATIVES - MANAGEMENT AND MAINTENANCE AT LAGUNA GRANDE PARK

General Issue: Sediment and nutrients from upstream urban land uses are the primary contributors to the low water quality in the lakes.
Specific Issue: Mitigate adverse effects of park development, maintenance and visitor use at Laguna Grande Park.

1	Utilize methods of landscaping and drainage which mitigate against pollution. Eliminate park users' refuse as a source of pollution.	Maintain high standards of development, maintenance and refuse collection at Regional Park		Nominal	Regional Park District	None	Regional Park District	None	None	

the populations that benefited from maintenance and improvement of water quality at the lakes.

When these considerations were applied to the alternative physical solutions, there emerged four major conclusions or sets of alternatives.

First, maintenance and improvement of the water quality at Laguna Grande and Roberts Lake depended critically on the cooperation of general-purpose governments: Monterey County, and the Cities of Monterey, Seaside and, to a lesser extent, Del Rey Oaks. The most promising procedures to control pollutant loadings that could be attributed to future actions depended on the local government power over land use and development. Requirements for clustering or roadway standards and ordinances related to grading practices or erosion control measures could be accomplished only by general-purpose governments. An implementation program depends on the active, supported involvement of the County and the cities, and considerations of technical efficiency, as well as intergovernmental relations, requires that this involvement be coordinated. A lack of coordination -- a situation in which some, but not all, of the agencies adopt appropriate erosion control ordinances, for example -- would be an invitation to noncompliance by affected individuals.

A second and related conclusion concerned the question of the existence or nonexistence of adequate staff resources to enact and enforce regulations or restrictions on development. It was concluded that an extensive evaluation and debate about the qualifications of agency staff to carry out the implementation mechanisms was unnecessary and inappropriate. Developing, adopting and enforcing regulatory approaches and building and operating the physical solutions are, or should be, well within the capacity of each of the jurisdictions that is being considered as an alternative responsible agency. During the ongoing monitoring program for the Section 208 effort (described in Section X), any failures to operate facilities efficiently or enforce ordinances equitably and effectively can be dealt with through normal governmental processes.

The third major inference that could be drawn from a consideration of governmental and technical alternatives was that there was no requirement for a new institutional capability, *per se*. A "new government" that would have certain advantages in terms of allocating costs is described immediately below, but even this alternative visualizes the use of existing staffs in existing roles to accomplish each technical solution. Every instance in Tables III-1 through III-7 involves a joint action by existing governments or actions by a "new government" that is, in fact, governed by the representatives of existing governments. Actual operational responsibilities would be assigned to a participating entity, with appropriate cost-sharing arrangements.

The fourth major conclusion was that cooperation between existing local governments was essential. Careful consideration was given to alternative ways in which this cooperation could be achieved. An obvious alternative was a Joint Powers Authority, whereby the existing and affected local governments would enter into a joint powers agreement to accomplish one or more of the technical solutions, and to share costs in a manner to be negotiated among them. Membership in the Joint Powers Authority could include the County of Monterey, the Cities of Monterey, Seaside and Del Rey Oaks, and the Monterey Peninsula Regional Park District. Any or all of the technical solutions could be implemented by the Joint Powers Authority or, for those alternatives that involved exercise of the police power over land use, by the members of the JPA who are general-purpose governments. Cost-sharing arrangements for the different technical alternatives could be negotiated, as appropriate to the alternative. There is no necessity that members share equally in the costs of all or any of the technical alternatives. In fact, the Joint Powers Authority could replicate the cost-sharing mechanism of the second major alternative (described subsequently), or could develop a formula that considered population in each jurisdiction, population in the jurisdictions that benefit directly from preservation and enhancement of the lakes, assessed value, amount of pollutants produced within each jurisdiction's boundaries, etc.

One disadvantage of the JPA mechanism is that its formation is entirely voluntary, as is its continuity. The involved governmental agencies are not required to participate, nor is their participation required to continue, beyond the terms of the joint powers agreement.

The alternative to a Joint Powers Authority that was evaluated was a County Sanitation District (California Health and Safety Code, Section 4700-4859) which would have the necessary powers to accomplish the technical solutions (except those related directly to the police power over land use), and which has the following advantages compared to a Joint Powers Authority:

- The boundaries of the County Sanitation District can be defined to include all properties that are determined to benefit from the preservation of Laguna Grande and Roberts Lake, or limited only to those properties that contribute to pollution.

- Formation of the District can be initiated by the County Board of Supervisors, subject to protest by registered voters in the District.

- Members of the Board of Directors are selected from constituent city and county governing bodies and serve ex officio, thus guaranteeing involvement of the agencies who in fact do have the police power over land use.

- A tax rate on real property can be enacted, with the approval of the voters.

- Withdrawal of a city or unincorporated territory is governed by the District Reorganization Act of 1965, and is thus subject to consideration by the Local Agency Formation Commission, rather than to the immediate decision of a single agency -- which decision might be colored by a short-term, but controversial, issue.

The Canyon Del Rey watershed -- a potential boundary for a sanitation district -- had an estimated population of approximately 11,500 in 1977 and would have an estimated 1995 population of approximately 29,900, including the proposed Monterey II project. These population estimates can be converted into approximate estimates of taxable retail property. An average household size of 2.9 persons and an average assessed value of $20,000 per unit (including all land in the watershed) would result in property tax revenues from a levy of $0.10 per $100 of assessed value of:

- $79,000 per year in 1977; and
- $206,000 per year in 1995.

This fairly modest tax rate would be sufficient to support the cost of lake maintenance.

C. The Recommendations for Laguna Grande/Roberts Lake

The institutional recommendations for Laguna Grande/Roberts Lake respond to two overriding alternatives.

- If a composite technical solution of minimum scope were to be recommended (e.g., nothing more than raising the outlet of Roberts Lake, aerating the lake, and minimal erosion controls upstream), a minimal institutional response would be appropriate.

- If the technical solutions include construction of major civil works (e.g., the sediment trap) and extensive, carefully coordinated land use regulations, then a more comprehensive institutional arrangement would be necessary.

The institutional recommendation for the minimal technical solution is quite straightforward. The agencies having jurisdiction over the two lakes would be responsible for the physical solutions and land use regulations could be enacted by each of the cities and the County, acting independently, with the normal and well-established lines of communication between staffs and governing bodies being used to assure coordination. The Cities of Seaside and Monterey would be encouraged to cooperate and take advantage of joint economies.

If a more comprehensive combination of physical and regulatory approaches to water quality management is adopted, a Joint Powers Authority would be the appropriate institutional mechanism for implementing the technical solutions at both lakes. Members would include the County of Monterey, the Cities of Del Rey Oaks, Monterey and Seaside, and the Monterey Peninsula Regional Park District. Fiscal arrangements for sharing of local costs (the local share of Clean Lakes grants from the U.S. Environmental Protection Agency, costs of maintaining the sediment traps, etc.) would be determined through negotiation between the members of the Joint Powers Authority.

The Joint Powers Authority could be used as a forum to assure coordinated implementation of grading ordinances, cluster development ordinances, etc. that would control erosion and sedimentation in the watershed. The Joint Powers Authority would also coordinate carefully with the Commandant of Fort Ord to encourage the use of best management practices and erosion control procedures on this federal installation.

The proposed JPA is separate and distinct from the existing JPA that was formed to acquire Laguna Grande Park. If appropriate arrangements could be negotiated successfully among the parties, the new JPA could also assume responsibilities of the existing JPA, and could operate and maintain Laguna Grande Park. Several advantages are apparent -- including the ability to submit a comprehensive application for federal grants -- but whether this consolidation should be accomplished is a matter for local determination.

The recommendation against formation of a county sanitation district or other alternatives was based on the following considerations.

First and foremost, the ability of a sanitation district to tax only the real property within its boundaries (or to assign user charges) is an advantage that may be more apparent than real. The fact that the subarea's tax base could support the lake preservation program using a $0.10/$100 tax rate by no means assures that the voters in the newly formed district would support such a tax rate. Also, the boundaries of the watershed by no means defined the boundaries of the property or the population that would be benefited by preservation of Laguna Grande or Roberts Lake. These bodies of water are recreational resources or wildlife habitat, and direct and indirect users reside far beyond the boundaries of a potential district. Yet, there appeared to be no overwhelming rationale for a "new" agency whose jurisdiction extended beyond the watershed boundary. The general funds of the County and the cities were a more appropriate source for financing the local share of total costs, and the definition of benefit, as between the populations in each jurisdiction, could be determined during the negotiation of the joint powers agreement.

Second, any advantage associated with the fact that a sanitation district could be initiated by the County Board of Supervisors was also more apparent than real. If any jurisdiction was not a fully committed participant, the most powerful element of the technical solution -- regulation of existing and new sources of erosion and sedimentation -- could be negated. Inability to reach an accord through intergovernmental negotiations should be a sign that a major portion of the technical solution is infeasible. This same argument applied to the relatively greater permanence of a sanitation district, compared to a Joint Powers Authority.

Two other alternatives for a responsible public agency were considered and rejected. Assignment of responsibility to the existing JPA, consisting of the Cities of Monterey and Seaside and the Monterey Peninsula Regional Park District would not involve all the general-purpose governments who have police power over lands in the watershed. Assignment of operating responsibility to the Park District would be counter to existing District policy.

The other institutional recommendations for Laguna Grande and Roberts Lake are straightforward. The State of California Department of Parks and Recreation has acknowledged a responsibility for control of the windblown sands that are gradually filling Roberts Lake, and responsibility for implementing landscaping and other mitigation measures can be accomplished by that agency.

Measures to encourage waterfowl that now use Laguna Grande to use Roberts Lake instead have been recommended by the California Department of Fish and Game in a letter to AMBAG's consultant, dated August 22, 1977. These measures are straightforward in terms of institutional requirements, and can be implemented by the agency that ultimately has responsibility for operating and managing Laguna Grande Park. The same institutional recommendation applies to litter control and other park management practices that will protect the quality of Laguna Grande.

Two comments can be made about the institutional/fiscal recommendations for Laguna Grande and Roberts Lake. First, the fiscal recommendations visualize maximum use of available grant programs and provide for negotiation between affected agencies regarding responsibilities for the local share of grants or local operating costs. These recommendations are generally transferable to the other water bodies in the AMBAG region that have experienced water quality deterioration because of human activities.

The institutional recommendation -- the use of a Joint Powers Authority if a comprehensive technical solution is undertaken -- is generally applicable, insofar as it considered alternative combinations of local governments and of coordinating mechanisms (e.g., a JPA, a County sanitation district) to ensure efficient and effective implementation. These alternatives can be used as a guide when detailed water quality management plans are developed for other water bodies in the AMBAG region, but the final choice will depend strictly on the institutional framework and the technical alternatives that are applicable to each specific situation.

- Poor maintenance -- particularly failure to remove solids from the tank -- leads to a breakdown of system performance.

A total of 109 separate problem areas were located in the two-county AMBAG region. In addition, the San Lorenzo Valley, the Prunedale Area and the Carmel Valley were identified as areas where urbanization may occur, but where septic tank systems or other on-site disposal systems may be less costly than collection and treatment.

Six separate technical approaches or action programs were evaluated by AMBAG staff. Perhaps the most important of these was an ongoing training program for public agency staffs who are responsible for:

- Evaluating the capacity of an entire planning area to permit the functioning of septic systems;
- Inspecting an area where septic systems are in use to determine whether there are hazards to the public health and, of increasing importance, whether cumulative effects that do not constitute a hazard to health nonetheless are indicators of future problems.
- Evaluating the capacity and suitability for an individual building site;
- Specifying the requirements for septic system design and construction;
- Inspecting the new or existing septic systems for adherence to construction standards or appropriate maintenance practices;
- Septic system cleaning and maintenance (including, in this case, training programs for private operators).

The recommendation for increased training was made with full recognition of three facts. Existing staffs have considerable expertise already. A great deal of professional judgment is needed to estimate the suitability of a site or a planning area for septic system use. The training requirements for individuals with different responsibilities are entirely different.

Recommendations were also made for specifications or required practices relating to the design and installation of septic systems, including:

- Installation of dual leach fields in new systems, so that one of the systems could be allowed to "rest" periodically and recover its capability to deal with effluent; and

IV. THE SEPTIC TANK CASE STUDY

The analysis of water quality problems associated with septic tanks that was undertaken by AMBAG staff differed somewhat from other case studies. The septic tank case study approached the technical issues on a two-county basis. The institutional recommendations for implementing the technical solutions are also countywide, but use the San Lorenzo Valley for purposes of illustration.

A. Pollution Control Recommendations for Septic Tanks

Septic tanks and other "appropriate technology" to solve water quality problems without resorting to areawide or regionwide collection and treatment facilities are receiving increasing technical attention and popular support in the AMBAG region. On-site disposal of liquid waste is increasingly being viewed as a less costly and at least equally environmentally satisfactory approach as traditional collection and treatment, and is no longer being considered only as an expedient for rural or low-density development "until sewers can be installed". Continued use of septic tanks depends on avoidance of water quality problems -- both those that might occur with increasing use and those that already exist in the AMBAG region.

The AMBAG staff summarized four principal causes of septic system failure (12).

- Poor site evaluation leads to the installation of septic systems whose soil characteristics, proximity to groundwater, drainage characteristics, etc. prevent the system from performing adequately. Research done recently by the State Water Resources Control Board (SWRCB) emphasizes the need to consider cumulative effects when areas are evaluated for their suitability for septic systems. In a significant number of identified instances, systems begin to fail when an area experiences significant buildout, even though each individual site may have had appropriate soil conditions.

- Poor design of the septic system, including poor placement, size and configuration of the system may prevent adequate treatment of the effluent, even if the site conditions are appropriate.

- Poor construction practices was identified as probably the most common cause of early septic system failure, because of sealing of the soil during construction.

- Installations of risers that would permit rapid identification of the location of tanks and rapid inspection of the systems for operating condition or need for maintenance.

Considerable emphasis was placed on the need for periodic evaluation of system performance, both on an areawide and individual-site basis. It was recommended that system failures be carefully documented and that consideration be given to use of a computer-based information storage and retrieval system operated by the State Department of Health. An information system would aid analysis of patterns of septic system failure. A parallel recommendation was that every septic system owner be required to certify that the system had been found to be in satisfactory condition by a qualified inspector, or had been emptied and otherwise maintained. Alternatives for the timing of mandatory system inspection plus necessary maintenance included periodic inspection/maintenance (e.g., every two years) or inspection/maintenance at the time of sale of the property.

A public information program was recommended to meet the needs both of public sector and private sector specialists who deal with septic systems and property owners, renters, etc. who use septic systems. An information bulletin for the homeowner was prepared by AMBAG and county staffs, and it was noted that the State Water Resources Control Board is beginning a public information and education program, while EPA will operate a "clearinghouse for alternative treatment information" to assure that both standard practice and innovative solutions are available to system designers and operators.

A final problem area was noted. Economical operation of septic systems depends on having nearby an environmentally suitable site for disposal of the septage that is pumped from the septic tank during maintenance operations. Lack of a suitable nearby site leads to significant cost increases for septic system maintenance, or to an increased temptation either to defer maintenance or to dispose of septage at unauthorized locations.

B. The Institutional Alternatives and the Recommendations

The institutional alternatives to implement the technical recommendations deal primarily with septic system specification, performance evaluation, and system maintenance. Institutional arrangements for the three other technical recommendations are straightforward and can be summarized briefly:

- Training programs for administrators, professional staffs, inspection personnel and system operators can all be accomplished using established institutions and programs, such as the emerging training program of the State Water Resources Control Board, the community colleges (with their willingness to establish training programs as soon as a need and a clientele have been established), and the Monterey Bay Area Regional Training Center. Training requirements can be coordinated among the County Health Officers, the Regional Water Quality Control Board, the jurisdictions' planning directors and other relevant officials. The ease with which training programs responsive to the septic case study can be accomplished does not in any way minimize the critical importance of a range of training opportunities for individuals with very different requirements. It merely reflects the fact that no additional institutional mechanisms are required. General revenue sources are the appropriate funding mechanism for incremental costs of training (with the possible exception of training for private operators who construct or maintain system), since the training enhances capability to meet existing responsibilities.

- Public information programs, similar to training programs, are of importance, but they do not require revised institutional arrangements. The alternative government agencies described below can carry out public information programs as part of their other responsibilities. AMBAG's recent effort demonstrates that an information bulletin can be distributed economically and effectively on a regionwide basis, at a cost of approximately $2,200.

- Septage disposal site location is a significant problem, but it is already being addressed in the solid waste management planning being done by Santa Cruz and Monterey Counties.

It is recommended that the primary institutional mechanism for septic tank monitoring and maintenance be an On-site Wastewater Disposal Zone (OWDZ). Enabling legislation was passed in the 1977 legislative session that permits any local government that is already empowered to acquire, construct, maintain or operate sanitary sewers or sewage systems, also to operate

> "'on-site wastewater disposal systems' (which) means any of several works, facilities, devices or other mechanisms used to collect, treat, reclaim, or dispose of wastewater without the use of communitywide sanitary sewers or sewage systems." (15, p. 2.)

There are appropriate local governments to establish On-Site Wastewater Disposal Zones (OWDZ) and to take advantage of the powers of an OWDZ in each of the major problem areas that were considered by the AMBAG staff. The County can form an OWDZ for an area in the absence of an appropriate or willing special district. The existing governmental agency that should create an OWDZ should be selected because it:

- Has a large enough geographic jurisdiction to encompass all areas that have, or would be suitable for, septic systems without infringing on the jurisdiction of another agency that operates either a collection and treatment system or another OWDZ; and
- Has the necessary technical capability to operate the OWDZ.

The San Lorenzo Valley County Water District would be an eligible agency that also has the technical capacity to manage an OWDZ.

The most significant powers of an OWDZ, in terms of ability to eliminate or prevent septic system problems, include the following:

- The zone can be established by resolution of the governing body of the implementating agency or by petition from residents or property owners in the area that would be served;
- The zone can be specifically and carefully defined to include only the areas where septic systems are appropriate;
- Of great importance, both the local health officer and the Regional Water Quality Control Board must "...specify the maximum number, type, volume, and location of on-site wastewater disposal systems which could be operated within the proposed zone without individually or collectively, directly or indirectly resulting in a nuisance or hazard to public health." (15, p. 3. Emphasis added.) If the specifications of these two agencies disagree, the lesser number of systems is to control.
- A determination must be made that the zone will not lead to a pattern of land use that would be inconsistent with applicable general plans, zoning or other land use recommendations.
- The OWDZ may operate and maintain the on-site disposal system(s), may enforce appropriate regulations for construction and may require or conduct on-site inspections.
- Systems that are not being operated or maintained in accordance with established standards may be declared a public nuisance and may be "abated" through a corrective

action taken by the responsible agency, with the cost of such action becoming a lien against the property;

- The governing body of the zone may assess a charge against the benefited property to cover all of the costs of operating the zone;
- Since an OWDZ is a properly established political subdivision of the state, it must be assumed that the OWDZ would be eligible to receive EPA grants -- including funds authorized by the Clean Water Act of 1977 to fund up to 85 percent of the cost of improving individual on-site wastewater disposal systems. (Eligibility depends on a finding that an on-site system is more effective in economic, social and environmental terms than construction of a sewer system.)

The recommendation that OWDZs are the preferred institutional approach is not a suggestion that other agencies have in some sense "failed" in the past. Instead, the OWDZ represents an attractive new opportunity that permits an operating agency to benefit from both the powers and the expertise of other officials (e.g., the County Health Officer, the Regional Water Quality Control Board), and to carry out a broader spectrum of responsibilities that would be possible, for example, through use of an inspection/maintenance district or a county service area. The latter agencies have functioned in the AMBAG region, but lack the power to:

- Establish capacity of septic systems on an areawide basis, considering cumulative effects; and
- Consider compliance with planning and zoning policies at the same time that waste treatment policies are established.

The clear authority of an OWDZ to inspect and (if necessary) maintain an individual septic system eliminates the need for other alternatives that were considered during the present project, including:

- Mandatory inspection of septic systems on a time-triggered basis (e.g., every two years); and
- Inspection every time a property is sold (enforced, presumably, by monitoring the records of the County Recorder).

This latter alternative had significant disadvantages, including the fact that there is no assurance that septic systems most in need of inspection and maintenance are those that are sold most frequently. In fact, it is possible to conjecture that the reverse is the case. The powers of an OWDZ eliminate this issue and permit inspections on a time-triggered basis.

The OWDZ can localize the fiscal impact of system maintenance by establishing a schedule of "benefits" that has the feature of a user charge and that, if necessary, can be collected as part of the tax collection procedure.

The OWDZ, as part of its ongoing responsibilities, would be able to monitor the areawide effectiveness of septic systems and to pinpoint problem areas larger in scope than a single site. The OWDZ could, if it chose, take advantage of the State's computer-based information retrieval capability, but it is recommended that individual OWDZs concentrate first on their primary mission: that of advising, regulating, inspecting and maintaining the septic systems. The scope of the information processing problem -- at least in the San Lorenzo Valley, which received a majority of attention during the case study -- could easily be accomplished by manual information management techniques.

Localized "zones" could be implemented immediately by existing special districts that have adequate management capabilities. The process of negotiating a series of zones to be managed by a single countywide agency would take a considerable time. Further, the existence of localized zones does not prevent ultimate assumption of operating authority by a countywide agency, if a clear advantage is demonstrated.

A final recommendation supports the concept of using OWDZs, but would be implemented in part by the county health officers (preferably through coordinated action with the Regional Water Quality Control Board) and in part by the appropriate planning departments.

Formal technical standards should be established to guide the process of determining individual and cumulative capacity in any proposed on-site wastewater disposal zone. These standards would set forth the criteria, the testing procedures and, as appropriate, the professional judgments that should be made in determining capacity in a zone. Then, as part of the process of preparing general plans or area plans, the appropriate planning department, after careful coordination with public works officials and officials of relevant special districts, would suggest the areas that are suitable for urbanization, but that should depend primarily on on-site disposal systems instead of conventional collection and treatment systems. Conclusions and recommendations on this point could be presented as part of the public facilities and services analysis that accompanied the general plan or the area plan. At this point, the Health Officer and the Regional Water Quality Control Board would be asked to make an advance determination of capacity, as required prior to creation of an OWDZ. This determination would be requested whether or not any preliminary steps had been made towards creation of an OWDZ and would be intended to:

- Provide an initial confirmation that the assumption in the general plan or area plan was correct -- that the area was suitable for urbanization without conventional collection or treatment systems;
- Prevent or discourage instances where existing or new landowners had unrealistic expectations about potential extent of urbanization or density of land use; and
- Establish a carefully developed estimate of cumulative capacity at the time that the process of urbanization begins.

Changes in land use requirements to facilitate the operation of septic systems (e.g., minimum lot sizes of one acre) should continue to be implemented as part of the planning and zoning process.

The institutional and fiscal recommendations associated with septic tanks are generally applicable throughout the AMBAG region. Identification of the most appropriate agency to create and operate an OWDZ must be determined on a case-by-case basis.

The above recommendation that OWDZs be used both to inspect and to maintain septic systems will not necessarily be accepted by AMBAG. Accordingly, additional research was done on legal and institutional issues associated with the recommendation by AMBAG staff that septic system inspection be required at the time real property is sold or transferred.

Section 25846 of the Government Code authorizes counties to require that transferors of residential properties located outside the boundaries of incorporated cities must obtain from the county a report of the residential building record for the property. Specifically, this section provides:

> "Subject to the provisions contained in Article 6.5 (commencing with Section 38780) of Chapter 10 of Part 2 of Division 3 of Title 4, a county may provide that prior to the sale or exchange of any residential building situated outside the boundaries of any incorporated city, the owner or his authorized agent shall obtain from the county a report of the residential building record showing the regularly authorized use, occupancy, and zoning classifications of such property."

The provisions contained in Article 6.5 and commencing with Section 38780 authorize cities to require reports of residential building records. Section 38781 further requires that these reports be delivered to the buyer or transferee of a residential building prior to the consummation of the transfer.

AMBAG staff requested consideration of whether counties in the AMBAG region could, pursuant to Section 25846, adopt legislation requiring the inspection of septic tanks incident to the transfer of residential property. Specifically, this legislation would require the transferor of residential property served by a septic tank to deliver to the transferee of such property a report of inspection of this tank prepared by a licensed inspector. This legislation would require this report to cite any deficiencies in the condition of the tank and to recommend how they should be corrected.

The issue raised is whether Section 25846 enables a county to adopt the septic tank legislation described above.

Two reasons argue against concluding that Section 25846 authorizes the septic tank legislation. One, the terms "regularly authorized use, occupancy, and zoning classifications" clearly do not encompass septic tank inspections. Two, the apparent intent of this section is to provide a mechanism for disclosing to the transferees of residential buildings those county land use and zoning regulations which apply to them. It does not appear to be the intent of this section to require the transferor to take any action to discover and disclose to the transferee the condition of the septic tank or any other system serving the building in question.

Although Section 25846 does not authorize the septic tank legislation described above, authority for such an ordinance is probably provided by Article XI, Section 7 of the California Constitution, which states:

> "A county or city may make and enforce within its limits all local, police, sanitary, and other ordinances and regulations not in conflict with general laws."

If a county is able to establish that the described septic tank legislation bears a reasonable relation to the public health, safety and welfare, Article XI, Section 7 would appear to permit the adoption of such legislation. A model for this exercise of the police power is provided by Section 1099 of the Civil Code, which requires the preparation and delivery of a structural pest (termite) control inspection report by the transferor to the transferee of residential property.

Further, there appear to be only two general or state laws pertaining to septic tanks -- Health and Safety Code sections 6950 et seq. and 25000 et seq. relating to on-site wastewater disposal zones and registration of septic tank cleaning businesses, respectively. It does not seem that local septic tank inspection legislation would be in conflict with either of these laws.

Hence, the consulting team's legal consultant concluded that Section 25846 does not provide authority for county legislation requiring septic tank inspection reports at the time of transfer of residential property, but that this authority is probably provided by Article XI, Section 7 of the Constitution.

An alternative approach would be to seek State Legislation specifically authorizing a requirement for presale inspection of septic systems. A model would be Senate Bill 330 introduced in February 1977, which would have required the seller of four residential units or less to provide the buyer with various items of consumer-oriented information (including whether the unit had a septic system, but not whether the system was properly maintained), and would make the seller liable to the buyer for actual damages suffered by violation of the law.

Public agency involvement in enforcing presale inspections would be expensive to the point of impracticality. Real estate transactions of the type that would trigger the requirement for a presale inspection are almost invariably subject to recordation at the Office of the County Recorder and thereby subject to public inspection. Original records or published summaries could be reviewed periodically by County staff to identify sales or transfers of residences and appropriate follow-up action could be taken if a notice of presale inspection corresponding to the sale were not on file. In fact, interviews by AMBAG staff confirmed that this procedure is used to administer the City of Monterey's program of presale inspection of residential property. Unfortunately, this procedure would be quite inefficient, with regard to enforcement of a septic system presale inspection requirement, since the great majority of the transactions that would be identified would involve residences served by collection and treatment systems, rather than on-site septic systems.

As a practical matter, enforcement of the requirement for presale inspection would depend on creating a situation either in a local ordinance or in a state law where the escrow agent as well as the other parties to the transaction are liable for damages resulting from failure to comply with the legislation. In such an instance, the escrow agent would, for reasons of self-protection, require evidence that the inspection took place, as a condition of closing escrow.

If the real estate industry's reaction to Senate Bill 330 is an indication, it should be understood that attempting to legislate a requirement for presale inspection would be controversial in the extreme.

V. THE EROSION AND SEDIMENTATION CASE STUDY

The evaluation of erosion and sedimentation problems in the AMBAG region was a regionwide case study, in that both the problem analysis by AMBAG staff and the institutional and fiscal recommendations apply generally throughout the two counties.

A. Summary of the Erosion/Sedimentation Problem

Extensive field investigations by AMBAG staff and interviews with public officials, farmers and others in both counties confirmed that soil erosion and resulting sedimentation is a significant problem throughout the region (13). Of particular importance, the effects of past practices -- past uses and misuses of the land by human beings -- is a significant contributor to the problem. An erosion/sedimentation program that concentrated only on eliminating future problems because of future land uses would be insufficient.

The effects of erosion and sedimentation are quite pervasive, affecting not only the quality of subsurface and surface water, but also having a strong influence on:

- Water conservation and water consumption practices;
- Loss of topsoil and contamination of lands with nutrients, pesticides, animal wastes, etc.;
- Air quality (presence or absence of dust) and contributions to the oxygen supply;
- Energy consumption for water pumping and transportation, sediment clean-up, equipment operations, etc.; and
- Wildlife habitat for both aquatic and upland species.

A total of 16 problem areas that contribute to the erosion and sedimentation were identified, and were classified as:

- Existing and potential problems associated with agricultural practices;
- Existing and potential problems associated with urban land uses; and
- Other problems, including sediment discharge from roadway run-off, stream bank erosion, and run-off from mines and quarries.

A total of 75 best management practices (BMPs) for erosion and sediment control were developed in detail, and were evaluated in terms of their effects on erosion/sedimentation problems and their environmental and financial impacts. A characteristic of the BMPs that is important to the institutional recommendations is that a great deal of technical expertise and practical experience is necessary when specific practices are selected to deal with specific existing or potential problems. Regulatory approaches (planning requirements, grading ordinances, etc.) can make reference to best management practices, but selection and application of these practices requires judgment, rather than the application of rote procedures.

Nonetheless, it was concluded by AMBAG staff that erosion and sedimentation control measures were available, practical and justified in terms of cost, compared to direct and indirect cost of the problems created by erosion and sedimentation. This conclusion applied both to prevention of future problems and mitigation of erosion/sedimentation problems that now exist because of prior practices of private landowners and public agencies.

B. Land Use Regulations for Erosion and Sediment Control

The recommended institutional approach for erosion and sedimentation control in the two-county region is "regulatory", in that requirements would be imposed both to control future problems associated with new land uses, and to correct past problems. At the same time, emphasis is placed on availability of technical assistance and on realistic time schedules (particularly for correction of existing problems), so that a spirit of compliance can be maintained, and a climate of "enforcement" can be avoided.

1. Regulatory Principles

The core concept for prevention of erosion and sedimentation problems associated with changes in land use and changes in agricultural practices is that each city and county in the AMBAG region endorse a series of regulatory principles and embody these principles in appropriate ordinances. The key regulatory principles are:

- Each city or county would require a review of all proposals for grading activity, whether for agricultural or urban purposes, to ensure that they minimize the effects of modifications to the land surface which might render it susceptible to erosion or adversely affect run-off patterns.

- Local ordinances would provide for the issuance of a grading permit based, in part, on a Grading/Erosion/Sedimentation Control Plan, subject to administrative review and approval with appeal to the governing body.

- City or county staffs could secure the advice of a designated Resource Conservation District in matters concerning run-off, erosion and sediment control, and could request their review and comment on all grading proposals and on all erosion and sediment control plans upon which grading permits will be based.

- A separate ordinance would be enacted to deal with maintenance of erosion control measures, authorizing public corrective measures and corresponding property liens.

- An ordinance would be enacted to deal with keeping livestock on small parcels of land that are not farms or ranches, focusing on areas likely to be subject to overgrazing and accelerated erosion; and would require the granting of a livestock permit before livestock may be maintained in certain circumstances.

- The applicable ordinance would ensure that lands are developed in reasonable increments which can be completed during a single construction season with scheduling to minimize exposure of soil. For purposes of simplified administration, a separate grading and construction practices ordinance might be enacted, distinct from agricultural practices.

- The applicable ordinance would specify temporary control measures, both vegetative and structural, to be applied concurrently with the development/construction process, after land-disturbing activity occurs.

- The local governments' position classification plan would require that personnel concerned with the review, approval and/or enforcement of any erosion and sediment control provisions or conditions of any ordinance or permit, or of any erosion and sediment control plans, be trained and experienced in the field of run-off, erosion and sediment control.

- Detailed grading standards would be established which cover construction and agricultural operations, cut and fill activities, vegetative preservation, storm run-off control and watercourse protection.

- In all ordinances, provisions would be included to ensure temporary erosion control measures are applied prior to maturation of permanent vegetation, and prior to installation of permanent structural measures.

- The technical standards of the USDA, Soil Conservation Service would be adopted as the administrative guidelines for all erosion and sediment control ordinances and for agency public works activities.

Two sets of model ordinances have been prepared as part of the consultants' effort. They are presented in the Appendix of this report in their entirety and are summarized below. The Grading/Erosion/Sedimentation Control Model Ordinance deals directly with sedimentation and erosion control and implements the above regulatory principles.

The Cluster Development Model Ordinance supports the intent of the erosion control model ordinance and, in addition, supports land use policies that would reduce urban run-off from streets and impervious surfaces (an issue relevant to the case study described in Section III) and would protect aquifer recharge areas (an issue discussed in Section VIII).

It is important to understand that the model ordinances were prepared as part of AMBAG's program of technical assistance to its constituents, and are intended for use by local governments that have not yet implemented erosion control requirements. The model ordinances may be appropriate in their entirety for certain jurisdictions, and other jurisdictions may except or modify portions of the ordinances. Jurisdictions such as the County of Santa Cruz that have already implemented strong, well considered erosion control procedures may not find them as useful. In any case, the institutional recommendation is that the regulatory policies related to erosion and sedimentation control be a part of the 208 Plan, and that the model ordinances be regarded as a supporting technical assistance product.

Two important and somewhat unusual concepts are included in the regulatory policies. First, specific policies and (ultimately) requirements included in ordinances would deal with agricultural land uses. Significant changes in the characteristics of agricultural land uses (e.g., changes from noncultivated to cultivated land or nonirrigated to irrigated land) would be defined in the ordinance and grading plans and management practices would be mandated. The ordinances would provide for mandatory inspection and, if necessary, abatement procedures.

A second significant feature of the regulatory policies is that they are intended to apply to the local governments themselves in their own public works activities. It is anticipated that best management practices would be incorporated in the practices and procedures of each local government. AMBAG, through its ongoing liaison activities with the California Department of Transportation, Fort Ord and federal agencies controlling significant land areas in the region would encourage the continued use of best management practices by these agencies, as well.

Given the fact that model ordinances have been developed as part of AMBAG's program, it is anticipated that implementing legislation in its jurisdiction can be accomplished over the next two years, after staff training. Availability of technical assistance to agency staffs is discussed below, as are the requirements for staff to monitor and enforce the erosion/sedimentation control regulations.

While the first line authority for enforcement would be embodied in the implementing ordinances of cities and counties, it is recommended that the Regional Water Quality Control Board increase its efforts to exercise its existing authority to control the effects of erosion and sedimentation. No additional statutory authority is required, but it may be appropriate, at the discretion of the Regional Board, to redirect its own budgetary resources to monitoring and abatement of particularly severe sedimentation problems, or to request additional funding from the State Legislature.

2. Grading/Erosion/Sedimentation Control Model Ordinances

The four ordinances constituting the grading/erosion/sedimentation control system provide innovative methods for dealing with a major wastewater quality problem. The erosion problem is often dealt with on two levels. The first is corrective measures designed to minimize impacts once they already have been generated. The second approach is to prevent adverse impacts and preserve watershed drainage characteristics before erosive forces ensue. The ordinances proposed are based largely upon the latter approach, although corrective measures are included. Accordingly, the control ordinance is a broad one, covering not only grading/erosion/sedimentation control, but also controlling water-degrading activities and requiring application of sound standards to preserve the environment. Additional ordinances are included for maintenance of erosion control measures, existing agricultural practices and the keeping of livestock.

These ordinances were written to allow considerable discretion by local governments. They are based on a system of permits, rather than on designation of specific zones. A broad set of standards encompasses most known standards to control erosion and sedimentation, and there is occasional overlap. It is unlikely that all of them will be necessary, and each jurisdiction is urged to review the standards and select those which constitute an internally coherent set of development standards to control its particular problem.

A distinction could be made in the "standards" to separate criteria for improvement and required provision of special facilities or improvements. For instance, the requirement that new plantings be protected with organic cover and disturbed soil surfaces be stabilized may fall into a new category of "improvements."

The grading/erosion/sedimentation control model ordinance includes "boiler plate" for inclusion in other ordinances. This material has not been repeated in those other ordinances.

The main thrust of the ordinances is flexibility. To accomplish this, some sections, such as performance bonds, abatement procedures, appeal procedures, etc. are left relatively general, so that local jurisdictions can reference them to existing procedures which govern the same subjects.

a. Summary of Model Ordinances

Grading/Erosion/Sedimentation Control. The purpose of this ordinance is to require a grading permit and submission of the grading/erosion/sediment control plan, concurrently with the application. The plan is described in detail and includes: existing conditions, mitigation measures, implementation and maintenance. The ordinance is enforced by civil fines and stop-work orders.

Maintenance of Erosion/Sediment Control Devices. A serious need is to ensure that once devices are installed, they are properly maintained. Under this ordinance, the director of the appropriate agency or some other designee may notify the property owner and require necessary corrective measures and a time schedule to take remedial steps.

Agricultural Lands Erosion Control Ordinance. This ordinance also requires the issuance of a permit and attempts to employ best management practices.

Livestock-Keeping Ordinance. This ordinance seeks to prevent water quality degradation due to the keeping and grazing of livestock. Standards deal with buffer zones as well as diversions, sediment basins and other devices. Permits are issued upon submission of a detailed activities plan.

b. Legal Issues

An exemption from a permit is provided for grading for agricultural purposes if done in accordance with a land conservation plan approved by the planning agency, or when it is determined by the planning agency that the use will not cause excessive erosion or sedimentation. This requires a careful indication of what constitutes an appropriate land conservation plan and what explicit criteria and findings would be used by the planning agency to determine an absent potential for excessive erosion. Under other exemptions, the planning director or other responsible official ("director") has discretion to exempt grading from the permit requirement if he/she finds that the grading is "minor", there is no potential for erosion, and the activity is consistent with the intent of the ordinance. Here too, there should be administrative guidelines under which the director can make such findings.

To ensure compliance with standards, there is authority for the director, or the board of appeal, to impose conditions on a permit. If the conditions were to become excessively onerous, the action might be considered confiscatory and inverse condemnation actions could result. Conditions, standards and criteria must be capable of achievement. For instance, the restriction on natural or constructed slopes in excess of a specified percentage must be reasonable so as not to preclude any development.

Upon submission of grading and erosion sediment control plans, there is a requirement that they be certified and prepared by someone who is a licensed professional experienced in erosion control and acceptable to the director. Such a "certification" provision can create problems because there is a broad range of professionals considering themselves qualified to prepare such plans. The extent to which licensing in agricultural engineering is required is conjectural. Could a civil or structural engineer or landscape architect qualify? Could an unlicensed planner qualify? The section on use of personnel qualified in the practice of revegetation also may be void for vagueness. The term "qualified personnel" may have to be specified in more detail.

A provision in the standards states that when the board determines efficiencies of scale or other factors make provision of facilities by public agencies rather than direct provision more advantageous, an in-lieu fee or dedication can be required. Occasionally, controversies have arisen in regard to such fees, particularly when a developer makes a showing that joint facility construction does not provide improvement for his or her property. It is conceivable that an applicant could argue that continued erosion may occur such as to require further expense on his or her part.

A provision allows access to the property for inspection. This might raise some issues with regard to trespass and rights of inspection, and it may be necessary to modify this to allow for limited inspection at specified times, notwithstanding the open nature of the inspection.

The waiver section is broadly written to allow for both flexibility and equity. However, to prevent abuse, it may be necessary to add specific findings to be required on the part of the director.

The Erosion/Sediment Control Device Maintenance Model Ordinance includes an increasingly used but potentially controversial abatement approach. This provides that where defects are noted, the director can abate the conditions after notification. Any cost incurred shall constitute a lien on the property. The conventional procedure is the provision of a performance bond to insure compliance. However, experience has shown that bonding companies are frequently unwilling to provide prompt compensation upon default, and litigation often makes the process unworkable. The abatement lien procedure appears to be more satisfactory, although with potential legal complexities.

The requirement for a livestock permit may generate opposition because livestock may be viewed as a typical accessory use for domestic purposes. The exemptions provide for waiving the requirement under conditions where the likely effect would be minimal.

Under the standards for the permit, the director can establish a buffer zone in which no livestock is permitted. This may raise legal issues if the designation of zones is considered a legislative rather than an administrative act. Hence, it may be necessary to establish a zone with approval by the legislative body.

c. Administrative Implications

The model ordinance should provide a usable example for local jurisdictions. For the immediate future, review of ordinances by AMBAG staff would be similar to the local coastal program effort in which the local government develops a program consistent with the intent of the coastal act. Presumably, there could be significant departures from the model ordinance, provided the major intent and key provisions were included. In such case, AMBAG or any other agency designated to carry out the 208 plan would have a major monitoring responsibility.

Several of the local jurisdictions already have grading ordinances, in which various of the provisions covered in these ordinances are already handled. Provided there were no serious inconsistency, another ordinance could be enacted using a provision which states that the more restrictive limitation would apply.

These ordinances will not be easy to implement. Erosion standards will involve technical personnel qualified to make the various judgments, often very technical, which lead to issuance of permits. They also will require significant amounts of staff input to educate a public not used to securing permits. To convey procedures, and to train appropriate personnel, will require at least one staff person per jurisdiction who is knowledgeable in the field of erosion/sedimentation control. Alternatively, local governments might secure outside services to provide this input on a continuing basis, with at least one staff person devoting at least 25 percent of his or her time to the system.

Enforcement will be a major need. For instance, grading for normal agricultural purposes is exempted from the requirement for a permit. Yet, activities of an agricultural nature which will still require a permit, including land-leveling or conversion of grazing lands to cultivation, will require careful enforcement.

3. Cluster Development Model Ordinance

The cluster development model ordinance is intended to encourage more sensitive site planning and a resultant clustering of development within a larger site. This should ensure that wastewater objectives and other natural resource and environmental quality objectives are fostered in areas of special sensitivity or significance.

The market for cluster development now appears to exist. Advances in site design and marketing have made such units easily saleable. Additionally, clustering provides more usable open area and carefully designed structures preserving views and ensuring recreational assets and amenity.

The major innovations in this ordinance are the comprehensiveness of standards, the use of a special cluster development combining zone and a systematic procedural process.

The regulations are proposed for application in a cluster development zoning district. These districts would be mapped in identified areas. This would require modification of existing zoning ordinances to include a cluster development combining district, which could use such letters as -CD after the normal zoning district name to indicate the combination.

The procedure would use a cluster development permit, issued upon a showing of adherence to all cluster development standards and permit criteria. The permit would be waived where the total development was less than a specified size considered negligible in terms of total environmental impact. The permit can be the use permit or conditional use permit operative in most jurisdictions.

a. Summary of Model Ordinance

Among the development standards and criteria for the permit are: compatibility with adjacent land uses; relationship to natural features; supersedence of normal density regulations; maximum residential coverage; a minor density bonus (not more than five percent) where the proposed development is kept at least 80 percent free from land alteration and is in permanent common open space through appropriate forms of perpetual restriction or public dedication; a majority of the open space is usable for recreational purposes with less than a 10 percent slope; mixture of housing types provided; creative site planning is evident; landscaping is effective; and a variety of transportation modes is fostered by site design reducing automobile usage.

Because of the more compact urban form, it may be feasible in some circumstances to override underlying height restrictions. A specific regulation is included which allows this up to a specified percentage over standard height. Moreover, normal restrictions relating to spacing between buildings can be waived, if the site planning is such that it ensures privacy, light and air, and proximity of compatible uses. Lot widths also may be reduced. Usable open space around buildings specifically is required because of a temptation in compact development to build on steep and irregular sites.

A relatively generalized standard relating to building appearance requires that materials and colors blend in with, rather than provide stark contrast to, surroundings. Although such judgments can be subjective, they are legally defensible and highly important to the visual blending of a particular development to its setting.

Standards for streets are provided which suggest that all streets should reflect a rural rather than urban character, that they should be designed for minimum land coverage and disturbance of soil, that certain variations from standards are permitted to prevent dedication of unnecessarily large parcels of land for street purposes, that one-way streets be allowed where terrain and public safety permit, that streets generally follow contours, that maximum grades be respected, and that streets not traverse slopes over 25 percent grade. Other standards are included which will ensure that severe land disturbance and disharmony with the natural landscape is avoided.

A new cluster development procedure is included in the model ordinance to be included in the procedures section of local ordinances. It encompasses the notion of a concept plan at the time of application, providing a general narrative and development direction to which the local public agency can react. This includes a generalized site plan showing at least the approximate location of buildings, rights-of-way, parking spaces, parking areas, natural open spaces, etc. An initial environmental study would be offered in conjunction with this concept plan. The plan is then reviewed and a conference held on it with the applicant.

Significant modifications could still occur in the site plan based upon application of standards. Thus, after the concept plan, conferences and reactions, a preliminary development plan is required. Here, the applicant provides more specific statements of intent and documentation of design and environmental character supported by specific graphic submissions, including contours, natural features, lot lines, building form and location, dedications, circulation system, vehicular and pedestrian utility systems, adjacent land areas, and perimeter treatment. Upon submission of the preliminary plan, it is reviewed, again using a conference format, and a draft environmental impact report is prepared, if necessary. The planning commission hears the preliminary development plan and makes a decision on it. Minor changes can be made in this, as authorized by the commission, without additional public hearings. After this, a final development plan is preparing, incorporating major revisions required by the planning commission, which is then submitted to the director who has the authority to grant the cluster development permit without further action.

b. Legal Issues

Overriding authority exists in the state planning and zoning law to enact planning and development control procedures. Although planned unit development procedures are not specifically authorized in that law, they have been upheld under general police power authority. There is little reason to assume that a site-specific ordinance would have less standing, and indeed may have more. However, the corollary of this is that the locations in which the cluster procedure would be mandatory must be thoroughly justified from a technical standpoint and the need for the procedure from the standpoints of erosion control, aquifer recharge, and other findings must be noted. Otherwise, difficult equal protection issues may be raised.

A continuing legal issue is the extent to which an underlying cluster development plan can remain applicable over an extended period. Some provision in the ordinance may have to be made to cover this matter.

Preexisting uses in the cluster development combining district may be troublesome. Such uses may have a significant effect on the larger area. Accordingly, nonconforming use provisions may have to be modified with some amortization provision included.

c. Administrative and Procedural Implications

The existing model ordinance, or some variant, should be included in the zoning ordinances of the local jurisdictions. It would be inserted in two separate sections -- combining zones, which if they do not already exist in the ordinance should be located after the basic zones, and procedures, in which the cluster permit procedure would be an identifiable unit.

The requirements for additional drafting of ordinances are generally limited. However, the locally devised "environmental impact report" guidelines must be carefully related to this procedure, and may require modifications. Additionally, subdivision control procedures should be reviewed in terms of timing of tentative map submittals to correspond to this procedure, or vice versa.

The implications for administrative burdens are significant, even though the zone will be mapped in limited areas. A cluster development permit application constitutes a significant commitment by the applicant, and deserves a correspondingly intensive and sensitive review by local government. The staff required to review the proposals need not be any more sophisticated in training or background that normal urban or environmental planning requires.

Many jurisdictions in the area already have planned unit development procedures similar in nature but less detailed. However, these procedures are permissive and not required in specific areas. They simply provide an opportunity for relaxation of requirements for developments of a certain size. It is clear that such procedures are not sufficient for the purposes of the Section 208 program. For instance, Monterey County has an "ST" District which is permissive and has few adjunct standards. The cluster development ordinance could be enacted and placed following the other "combining" type zones after Section 28.12, with the procedure included as Section 33.

C. Corrective Action

The conclusion that prior land use practices -- including prior practices of public agencies -- were significant contributors to the sediment problem led to a novel recommendation. Each general-purpose government in the region should identify specific sedimentation problems that are the result of public agency action (whether their own or those of another government) and should prepare a long-range action program and financing plan to mitigate or eliminate the effects. This plan would involve direct action to solve problems that resulted from past practices of the agency. In instances where a public works project of some agency other than a city or county is clearly responsible for a sedimentation problem, it would be appropriate to enter into negotiations with the responsible agency and attempt to obtain a schedule and a management plan to eliminate the problem.

It is recommended that the 208 Plan contain a requirement that, within two years, general-purpose governments prepare a plan for correcting prior sedimentation problems associated with public works projects. This plan should contain an implementation schedule, together with a realistic financing plan that would accomplish the corrective action within an additional 15 years. It can be expected that corrective action would be financed by a combination of EPA Section 208 grants and redirection of ongoing public works activities. The plan would contain a description of intergovernmental arrangements that had successfully been negotiated.

The issue of sedimentation problems because of prior actions of private landowners has not been resolved. Problems of financial hardship, enforcement and public acceptance preclude a recommendation that corrective action be mandated on all private lands in the two-county region. As a somewhat unsatisfactory substitute, it is recommended that the ongoing 208 program continue to monitor the effectiveness with which the total problem of erosion and sedimentation (whether caused by prior public agency, prior private agency or future practices) is being solved. If progress is deemed unsatisfactory without a program to correct existing problems on private lands, more stringent provisions will have to be considered.

Full recourse should be taken of available statutory authority to abate critical problems on private land. As noted previously, the Regional Water Quality Control Board has the authority to deal with severe sedimentation problems and existing statutes prevent, for example, interference with natural waterways because of sediment build-up. Enforcement of these provisions may effectively deal with many of the most severe existing sedimentation problems.

D. Technical Assistance

Technical assistance programs, including:

- Training for soil conservation technicians, field inspectors and enforcement personnel;
- Education programs at the college and post-graduate levels in the theory and practice of soil management and erosion control; and
- Seminars and other forums for professionals at all levels of responsibility and experience to share the results of successful and unsuccessful experiences

are essential to the erosion and sedimentation control program. As noted previously, regulatory requirements cannot be overly specific, but must necessarily take recourse in the statement that "...best management practices should be applied." Solutions to existing or potential erosion problems depend strictly on local circumstances, soil conditions, existing or proposed land uses, etc. and selection of the best strategy or strategies depends on experience and judgment. Skilled, experienced staff must be available to develop and enforce the regulatory policies that were described previously. Since the recommended regulatory requirements are a departure from past practice -- particularly in the case of agricultural land uses -- considerations of equity and public acceptability demand that staffs have, in addition to significant technical skills, a capability to provide education and training to help landowners adopt best management practices. Staff should be able to demonstrate that such practices are in the economic self-interest of the landowner, as well as appropriate public policy.

The need for skilled practitioners who are sensitive to the economic situation and attitudes of the individuals who will be affected by the requirements poses an interesting institutional problem. General-purpose local governments (cities and counties) have both the mandate and the authority to implement regulatory policies and ordinances. The Regional Water Quality Control Board has supportive authority to accomplish the same objectives, yet the AMBAG staff has concluded that the greatest expertise is currently available, not in these agencies, but with the U. S. Department of Agriculture, Soil Conservation Service, with their colleagues in the local Resource Conservation Districts and with the California Department of Transportation.

Unquestionably, there are individual exceptions to this assertion -- including instances where county or city staffs are extremely well trained, knowledgeable and sensitive to the position of urban and agricultural land users -- but the assertion is accepted for purposes of the institutional analysis. Nonetheless, it is recommended that the Resource Conservation Districts (for example) not assume regulatory authority. Instead, appropriate training and education programs and means of interagency communication and coordination should be developed to train city and county staffs. Ordinances should be enforced exclusively by the cities and counties. The rationale for this recommendation is threefold.

First, lack of training and experience is a temporary problem, and is not a rationale for recommending significant shifts in responsibility between governments, for which there is little or no other justification. Lack of special skills in the areas of erosion and sedimentation control are an example not of the need for transferred responsibilities or new, specially trained staff, but instead of a need for in-house training programs. Public agencies, as well as private organizations, must deal constantly with changing technology and increasing needs for knowledge. A policy of meeting these needs with staff increases rather than in-house retraining (at levels ranging from senior officials to entry-level technicians) is both overly expensive and wasteful of human capital and human potential.

Secondly, there is no question that a regulatory approach to erosion and sedimentation control -- and for that matter, a policy calling for corrective action of unsatisfactory control practices that have been used by public agencies in the past -- will meet significant resistance. There is little argument for adding an institutional problem to a technical and (in some cases, undoubtedly) economic problem.

Finally, the Resource Conservation Districts have developed close working relationships with their constituency in the agricultural community. Their ability to communicate, to share experiences and to change agricultural or other practices through encouragement and education is essential to the success of the erosion and sedimentation control program. It would be unwise to risk compromising established working relationships by casting the Resource Conservation Districts in a regulatory, rather than an advisory, role.

It was not possible to develop in detail the education and training requirements for the staffs that will be responsible for enforcing the regulatory policies and for providing advice and technical assistance to affected landowners. Experience in other jurisdictions with fairly sophisticated grading ordinances indicates that necessary training can be accomplished through normal career development and education programs for existing staff. Every opportunity should be taken to increase opportunities for training and education, and to finance these efforts through such federal programs as the Intergovernmental Personnel Act.

VI. THE SALINAS VALLEY/PAJARO VALLEY AGRICULTURAL AND MUNICIPAL DISCHARGE CASE STUDIES

Water quality in the Pajaro and Salinas groundwater basins was selected as an appropriate case study because of a clearly increasing build-up of nitrates and salt in the groundwater (21). The nitrate build-up has necessitated deepening or abandoning more than 70 domestic water supply wells in the Salinas Valley. Many other wells in both valleys are approaching the public health limit of 10 parts per million nitrate concentration. Unfortunately, the technical studies revealed a situation where an obviously worsening problem does not have an obvious technical solution, largely due to specific evidence regarding sources of nitrate pollution.

A. Summary of the Technical Issues

The most fundamental reason for concern about nitrate concentration is that the public health standard of 10 parts per million nitrate concentration was established because higher levels are associated with a blood disorder in infants called methemoglobinemia. This disease can be fatal, and enforcement of the nitrate standard is considered to be a matter of urgency by the public health officers in the two counties. State law requires that domestic wells serving four or more households be monitored for nitrate concentration. The local ordinance in Monterey County requires monitoring for wells serving two or more households.

Three alternative sources of nitrate pollution were evaluated. The first source -- and the one that was considered to be the most probable source of increased concentrations of nitrates, by the AMBAG staff and water quality consultants -- was agriculture. Estimates for the Salinas Valley indicated that as much as 85 percent of the net contribution of nitrate could be associated with the Valleys' croplands. It was also concluded that changes in irrigation and fertilizing practices could reduce the quantities of nitrate that reached the groundwater -- often without any reduction in productive yield of the agricultural crop. In some cases, it was anticipated that optimum application of the optimal fertilizer could produce the same or greater yields as presently occur with a significant reduction in amount of fertilizer and (because of the cost of the fertilizer) with an increase in profitability per acre.

The same general conclusions applied to irrigation practice. Analytical methods to determine the optimum amount and timing of irrigation might improve yields while, at the same time, reducing any opportunity for irrigation water to transport nitrates into the groundwater.

The technical solutions that were considered as candidates to reduce nitrate concentrations from agricultural practices included:

- Education programs to encourage farmers to use optimum fertilizing and irrigation practices;
- Technical assistance to farmers in testing soil, water and plant to permit specialists to design an optimum fertilizing and irrigation program for different sites;
- Demonstration projects similar to the one now being undertaken in the Santa Maria area (supported by the U.S. National Science Foundation's program of Research Applied to the National Needs (RANN)) that demonstrate the effectiveness of best management practices;
- A requirement that use of groundwater be metered, as a first step towards understanding the contribution of irrigation practices to nitrate concentration;
- A system of user charges for groundwater to provide an incentive to adopt optimum irrigation practices;
- A regulation that would limit or otherwise control the amount of nitrate fertilizer that could be used on specific crops in specific areas.

A second potential source of nitrate pollution was the discharge from the cattle feedlots and the dairies in the region, particularly in the Salinas Valley. These sources were estimated by AMBAG staff and consultants to be a possible contributor of up to 17 percent of the total nitrate that reaches the groundwater. The effect of this source could be mitigated by requiring installation of equipment and practices that would dispose of solid wastes through on-site collection and conversion to nonpolluting uses and disposal of liquid waste through such measures as spray irrigation on suitable croplands.

Percolation ponds are used extensively in the Salinas Valley for disposal of municipal and industrial waste. Significant increases in nitrate levels have occurred in the water supply wells of cities that use this method of disposal. Crop irrigation was suggested as an alternative -- and more costly -- method of disposal.

Finally, inadequate sealing of wells during construction and improper closing of abandoned wells was identified as a potential source of pollution of deep aquifers, since poor quality water from shallow aquifers or from the surface could migrate through the abandoned wells.

The overwhelming thrust of the comments that were received on AMBAG's technical studies was that there was extensive disagreement as to the cause of nitrate concentrations. There was similar disagreement as to whether suggested mitigation measures would, in fact, have the desired impact. Particularly in those instances where mitigation measures involved possible reductions in agricultural productivity, the direct and indirect economic impacts could be calculated quickly, but there was technical disagreement about the benefits to be gained. The questions that were raised during the public review of initial technical studies included:

- Whether minerals naturally present in the soil were the major contributors to build-up of nitrate concentration;
- Whether, in fact, the problem was now improving because of improved and more technically sound fertilizing and irrigation practices, but that the results of now-abandoned tendencies to overfertilize or irrigate were only now reaching the groundwater (a process that admittedly can take over a decade);
- Whether the hydrologic properties and agricultural practices of the Salinas and Pajaro Valleys were in any way comparable and whether any results from one area -- even if substantiated and accepted -- could be applied to the other.

A full range of institutional and fiscal responses to technical alternatives was developed (and is described immediately below), but it became obvious that there was insufficient agreement among technically trained individuals and insufficient supporting data to support any implementation strategy beyond those of monitoring and research programs, and education in best management practices.

B. Fiscal and Institutional Alternatives

Alternative institutional alternatives were developed to implement each of the strategies that were discussed seriously. They are summarized in Tables VI-1 through VI-4.

Several alternatives depend on, or require, metering the amount of well water that is used. It was suggested by AMBAG staff that this measurement could be accomplished by inference. The local electric utility offers a service to farmers where the amount of electric energy used by a well-water pump is measured at the

Table VI-3

SUMMARY OF INSTITUTIONAL/FISCAL ALTERNATIVES - IRRIGATION AND FERTILIZER PRACTICES

Case Study Area: Salinas Valley/Pajaro Valley

Issue: Irrigation and fertilizer practices are contributing excessive amounts of nitrates to the groundwater.

Alternative	Technique	Implementation Action Needed	Estimate of Total Cost (Public & Private)		Who Bears the Cost?	Potential Nonlocal Funding Sources	Responsible Public Agency	Public Agency Staffing Needs	Effect on Other Public Agencies	Comments
			Capital	Operation & Maintenance						
1	Improve fertilization and irrigation practices.	Conduct a voluntary education program on best recommended practices.	None		County, State and federal. (Program would be funded from Farm Advisor's office.)	Incremental local cost is zero.	Farm Advisor.	None	None	
2	(Same)	(Same)	$3,000		Junior college district and State of California.	Approximately 1/3 of the program would be funded from non-local sources.	Hartnell Junior College.	One part-time instructor.	None	
3	Technical assistance in testing water and soil.	Farmers would contract with private testing firm for performance standards related to irrigation and to fertilizer application.		$2.50/ Acre (Overall cost undetermined; equals available public funds)	Counties Monterey and Santa Cruz	Title V of 1972 Rural Development Act.	Farm Advisor.	None	None	Program would be short-term (perhaps one year).
4	Demonstration of best management practices (emphasis on fertilizer and water practices).	Use the Model Implementation Program (MIP) of the U. S. Department of Agriculture/ U. S. Environmental Protection Agency to demonstrate best management practices in the Gloria Resource Conservation District.	$7.375 million over three years.		Cost sharing between U. S. and local sources to be negotiated.	U.S. Department of Agriculture/ U. S. Environmental Protection Agency.	Gloria Resource Conservation District and AMBAG.	4 person-years per year for 3 years.	Boundaries of study area could be amended to include parts of other Resource Conservation Districts.	

Table VI-4 (Continued)

Case Study Area: Salinas Valley/Pajaro Valley

Issue: Irrigation and fertilizer practices are contributing excessive amounts of nitrates to the groundwater.

Alternative	Techniques	Implementation Action Needed	Estimate of Total Cost (Public & Private) Capital	Estimate of Total Cost (Public & Private) Operation & Maintenance	Who Bears the Cost?	Potential Nonlocal Funding Sources	Responsible Public Agency	Public Agency Staffing Needs	Effect on Other Public Agencies	Comments
5	(Same)	Develop a technical assistance program in association with University of California, Cooperative Extension.	$5,000[1] in each county.		Local share borne by Monterey County and Santa Cruz County.	Majority of cost borne by Cooperative Extension. Program would be a very likely candidate for funding under Title V of the 1972 Rural Development Act.	Farm Advisor (both counties)	None	None	
6	Require metering of groundwater use.	Enact ordinance requiring installation of approved meters on all well pumps and monthly submission of water use records.	Nominal		Operator pays meter pump installation and maintenance costs. Inspection and enforcement costs are public costs.	None	County Flood Control District (both counties).[2]	None	Data would be useful to public and private water agencies.	
7	Require metering of water use from groundwater supplies; institute a uniform or graduated charge per acre-foot of water used.	(Same.) Enact enabling legislation for user charges.	(Forthcoming)		Operator pays user charge as well as meter installation cost. County is responsible for inspection and enforcement.	None	Monterey Flood Control District and Santa Cruz County Health Department or Flood Control District.	One person-year.	(Same)	User charge must be of significant magnitude in order to effect use. Fees collected would be used to support other selected alternatives.

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[1] This local contribution would be expected to lead to a commitment by Extension of approximately 10 person-years of technical assistance.

[2] The Agricultural Commissioner would be given the responsibility if metering is the only requirement.

Table [illegible] (Continued)

Case Study Area: Salinas Valley/Pajaro Valley

Issue: Irrigation and fertilizer practices are contributing excessive amounts of nitrates to the groundwater.

Alternative	Technique	Implementation Action Needed	Estimate of Total Cost (Public & Private) Capital	Estimate of Total Cost (Public & Private) Operation & Maintenance	Who Bears the Cost?	Potential Nonlocal Funding Sources	Responsible Public Agency	Public Agency Staffing Needs	Effect on Other Public Agencies	Comments
8	Require metering of water use from groundwater supplies; limit individuals to a total water use ration.	Enact ordinances limiting water use and requiring monthly submission of water use records.	(Forthcoming)		Operator bears economic cost of lowered production (if any).	None	(Same)	(Same)	(Same)	
9	Regulate amounts of fertilizer that would enter the groundwater.[1]	Enact appropriate regulatory ordinances.	(Forthcoming)		Operator bears production losses below those obtainable under the optimal economic yields without regard to impacts on groundwater. The public agency would bear the enforcement costs.[2]	None	County Agricultural Commissioner.	10 person-years per year.	None	Additional research is needed to verify costs of technically feasible and equitable monitoring and enforcement programs.
10	(Same)	(Same)	(Same)		(Same)	None	County Health Officer.	(Same)	(Same)	(Same)

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[1] The actual regulation would control the amount of nitrates entering the groundwater and would vary with irrigation practices and soil types, and groundwater recharge characteristics, as well as with the amount of fertilizer.

[2] If public support were demonstrated, a subsidy could be considered that would restore all or part of the difference between maximum economic yield and yield as permitted by regulations.

Table VI-2

SUMMARY OF INSTITUTIONAL/FISCAL ALTERNATIVES - FEEDLOT AND DAIRY WASTE

Case Study Area: Salinas Valley/Pajaro Valley

Issue: Agricultural discharges, particularly from feedlots and dairies, are contributing excessive amounts of nitrates to the groundwater.

Alter-native	Techniques	Implementation Action Needed	Estimate of Total Cost[1] (Public & Private) Capital	Estimate of Total Cost[1] (Public & Private) Operation & Maintenance	Who Bears the Cost?	Potential Nonlocal Funding Sources	Responsible Public Agency	Public Agency Staffing Needs	Effect on Other Public Agencies	Comments
1	Collect solid wastes for disposal and collect liquid wastes for evaporation at each site.	County adopts special nitrate discharge requirements to be met by operator.	Paved manure storage areas: $1/head(/yr) Lined evaporation ponds: $7/head	$.80/head	County General Funds bear cost of staff position; operator bears other costs (with limited opportunity to pass costs forward in this instance).	California Pollution Control Authority. U.S. Dept. of Agriculture (through ASCS, FMHA).	Monterey (and possibly Santa Cruz) County Health Departments.	One staff position ($20,000).	Requires coordination with Regional Water Quality Control Board.	
2	(Same)	(Same)	(Same)		(Same)	(Same)	County contracts with Central Coastal Regional Water Quality Control Board (RWQCB) for enforcement.	One staff position.		
3	(Same)	RWQCB identifies discharges and adopts additional discharge requirements to be met by operator.	(Same)		Enforcement is a State expense.	N.A.	Central Coastal RWQCB.	None	(Same as 1)	

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[1] These are approximate costs; actual costs will vary with feedlot capacity and average number of cows. Costs are nominal for other recommended feedlot/dairy measures, i.e. increased scraping and removal of feedlot manures, and application of liquid dairy wastes to additional acres of pasture or cropland.

Table VI-3

SUMMARY OF INSTITUTIONAL/FISCAL ALTERNATIVES -
MUNICIPAL AND INDUSTRIAL WASTES

Case Study Area: Salinas Valley/Pajaro Valley

Issue: Percolation areas for municipal and industrial wastes are contributing excessive amounts of nitrates to the groundwater.

Alternative	Techniques	Implementation Action Needed	Estimate of Total Cost (Public & Private) Capital	Estimate of Total Cost (Public & Private) Operation & Maintenance	Who Bears the Cost?	Potential Nonlocal Funding Sources	Responsible Public Agency	Public Agency Staffing Needs	Effect on Other Public Agencies	Comments
1	Dispose of wastewater by irrigation or land disposal.	Give full consideration to wastewater irrigation as an alternative during the ongoing Section 201 water quality studies.	Estimates should be provided as part of the Section 201 studies.		Local: 12½% State: 12½% US EPA: 75%	Wastewater irrigation programs are fully grant fundable.	Each local government.	One staff position per system.	None	

Table VI-4

SUMMARY OF INSTITUTIONAL/FISCAL ALTERNATIVES -
ABANDONED WELLS

Case Study Area: Salinas Valley/Pajaro Valley

Issue: Improperly sealed or capped wells allow transference of poor quality water from surface or perched aquifer to deeper water supply.

Alternative	Techniques	Implementation Action Needed	Estimate of Total Cost (Public & Private) Capital	Estimate of Total Cost (Public & Private) Operation & Maintenance	Who Bears the Cost?	Potential Nonlocal Funding Sources	Responsible Public Agency	Public Agency Staffing Needs	Effect on Other Public Agencies	Comments
1	Seal all new wells; find and cap abandoned wells.	Require sealing of all new wells and inspect for conformance; develop and execute program to find and cap abandoned wells.		Nominal	Well owner pays for sealing or capping. Inspection and enforcement are public costs.	None	County Health Officers.	Nominal	None	

same time that the output of the pump is measured. Monthly electric energy consumption can then be converted to water use, provided that each pump is separately metered and provided that no other equipment is connected to the metered circuit.

A representative of the major electric utility in the AMBAG region stated that the utility would not willingly participate in any mandatory pump test program, citing:

- Problems associated with the fact that agricultural operators may consider data about their use of irrigation water to be proprietary and useful to competitors; and

- Lack of staff to accomplish a comprehensive pump test program.

A mandatory pump test program would have to be preceded by state legislation requiring the regulated utilities to participate. If such legislation were passed, the utilities would almost certainly request rate adjustments to cover all direct and indirect costs.

The institutional alternatives were, by and large, developed before a consensus was reached by AMBAG staff and consultants that there was insufficient technical agreement to support immediate implementation of any strategies other than monitoring, research and continued education. The institutional and fiscal alternatives that deal with these latter strategies are discussed below.

C. The Recommendations for Control of Nitrate Concentrations in the Groundwater

In spite of the number of alternatives summarized in Tables VI-1 through VI-4, the ultimate institutional recommendations turned out to be rather straightforward. Observation and interviews confirmed that the Farm Advisor in each county, supported by State Specialists, had the capacity and the commitment to institute training programs on fertilizer practices and irrigation practices. These programs would provide technical advice on the use of fertilizers -- including amounts, timing and application procedures -- to optimize crop yields without overfertilizing the crop. Indications were received during the interviews that these training programs could be included in the ongoing programs of the Farm Advisors and would not require additional funding. Furthermore, the Advisors felt that the perennial problem of voluntary education -- the most highly trained and motivated operators tend to seek out training in improved practices, while those with the greatest need do not participate -- was, in fact, not a problem in this instance. The programs of the Farm Advisors were effective in reaching the full range of the farmers in the two counties. Nonetheless, this subject should be explored further with the Farm Advisors and with representatives of University of California Cooperative Extension after detailed training programs have been developed.

Cooperative Extension is committed to joint programs with local governments and a nominal financial contribution (e.g., $5,000) from the general fund of each county could produce a "multiplier" in specialized technical assistance from Extension specialists, leading to a total additional training and technical assistance program that would cost between $50,000 and $100,000. The Director, Cooperative Extension, has broad discretion as to how the agency's extensive budget ($27 million in 1976-77) will be allocated to alternative research and training programs. It is entirely realistic to assume that the combination of a significant technical problem, an instance where conclusions could be expected to be transferable and a tangible indication of local support will generate assistance from Cooperative Extension.

The problem of improperly sealed wells can be solved by an inspection and enforcement program that would require the use of accepted practices when wells are abandoned. This function could be carried out by the county health officers in the course of their existing duties to test nitrate levels.

Local governments' response to questions raised during the technical investigation about the contribution of nitrates from percolation ponds was that alternatives are now being evaluated as part of waste treatment planning programs. Representatives felt that any duplicatory studies or any recommendations about abandonment of percolation ponds would be premature until the water quality studies had been completed.

Finally, a consensus emerged that because there was uncertainty about the seriousness of the problem, the 208 Plan should not deal directly with the question of feedlot and dairy wastes, but should note this as an area of evaluation and action by the Central Coast Regional Water Quality Control Board.

VII. THE SALTWATER INTRUSION CASE STUDY

The intrusion of sea water into coastal aquifers occurs increasingly as the level of the water table is lowered because of:

- Increased groundwater use for municipal and agricultural purposes; and
- Loss of land areas for groundwater recharge, as a result of urban development. The resulting hydraulic gradient permits saltwater to migrate further and further into the aquifer.

Measures to deal with water use for agriculture were discussed in Section VI, and preservation of groundwater recharge areas is discussed in Section VIII. The present section deals with saltwater intrusion *per se*.

The Pajaro Valley was selected as a case study because it is generally recognized that saltwater intrusion is a serious and increasing problem (21). Significant concentrations of saltwater have been moving inland gradually since the 1940s, affecting groundwater in an area of more than 10 square miles. It is estimated that total outflow from the groundwater in the Pajaro Valley exceeds total inflow by an average of 17,500 acre-feet per year.

Three technical alternatives were determined to be applicable to the problem of saltwater intrusion: a new source of water could be used for groundwater recharge (or possibly as a replacement for groundwater); water conservation measures could be used to decrease the demands on the groundwater; and sea water intrusion barriers could be installed.

The most direct and obvious solution to a lowered water table -- a new supply of water -- would appear to be technically feasible for the Pajaro Valley. The U.S. Bureau of Reclamation's San Felipe Project could supply the required additional water, and some initial provisions have been included in the San Felipe project design to make this technically possible. A commitment as to the cost of additional water from the San Felipe project has not yet been made and, of greater importance, the overall economic, environmental and social impacts of imported water on the Pajaro Valley have not been analyzed. It is doubtful that it would be technically desirable or politically feasible to develop a source of imported water that would meet, but would only meet, the requirement for groundwater recharge. Instead, a new water source would have to be evaluated for its growth-inducing impacts and its compatibility with local plans and policies, particularly the emerging growth management policy of Santa Cruz County.

A detailed evaluation of alternative water sources is described in Section X of this report. An augmented program of groundwater monitoring is also described. This program would provide additional information on the extent of saltwater intrusion.

In addition to the reductions in groundwater use for agriculture that may ultimately result from the education program described in Section VI, two alternatives were considered to reduce the total use of groundwater. The first -- reduction of municipal water uses through a combined program of homeowner education and regulation -- is direct, obvious and well within the established power of local governments in the area. Experience in northern California during the recent drought confirmed that homeowners can reduce consumption on the order of 30 percent following a consumer education program, and well over 50 percent if rationing is imposed.

The fact that water supply agencies have the authority and capacity to achieve a reduction in municipal water does not automatically guarantee that such a reduction will take place. The successful water conservation programs that took place during the drought were in response to an immediate emergency. The problem of sea water intrusion is of less immediate concern and may be perceived as a problem in inverse proportion to the existing concentration of salts at the well supplying each homeowner. It will obviously be necessary to obtain a political consensus as to the urgency of saltwater intrusion problems before a coordinated water conservation education or water rationing program can be implemented. The agency that may be most directly affected at the present time -- the City of Watsonville -- could implement its own conversation program immediately.

A supporting action for water conservation that was taken by the Santa Cruz County Board of Supervisors was enactment of Ordinance No. 2420, which provides for water conservation throughout the County by the following means.

- Provision must be made for roof run-off to percolate to the groundwater.

- During construction, erosion control measures must be applied to disturbed land surfaces during the rainy season.

- All construction projects requiring a building permit must use only reduced-flow toilets, shower heads and sink faucets.

- Pressure-reducing valves must be installed on the incoming waterline.

These typical water conservation measures are important in themselves. As an additional benefit, they demonstrate a commitment and an example of water conservation that may help independent water districts and other local governments to obtain acceptance from their constituents for a water conservation program.

A procedure is available that is considerably more drastic than a water conservation program. Since 1969, the State Water Resources Control Board has had the authority under Section 2100 of the State Water Code to "...file an action in the Superior Court to restrict pumping, or to impose physical solutions, or both, to the extent necessary to prevent destruction of or irreparable injury to the quality of (ground) water. In such action, all of the claimants to the use of the affected water...shall be named as defendants."

The solutions that could be mandated by the Court, after a successful adjudication, include a reduction in the use of groundwater (with the authorized amount allocated in accordance with the findings of the Court) or physical solutions such as replacement of the groundwater or (presumably) construction of groundwater barriers.

After the State Department of Water Resources or another body has prepared a recommendation for the protection of the quality of groundwater and after a public hearing, the State Board Action moves forward in two steps:

- First, the Board must "...determine whether any local public agency overlying all or a part of the groundwater basin will undertake such adjudication of water rights"; and

- If no local agency commences an action within 90 days after notice of the decision of the Board that adjudication is appropriate, the Board may file the appropriate action.

While the State Board has not exercised its powers under Section 2100, a task force is currently engaged in developing regulations and considering the usefulness of this authority in groundwater basins throughout the state. The fact that the state can cause an adjudication of groundwater rights -- and, of no small importance, pay the costs of what would certainly be protracted and expensive litigation -- is obviously a powerful tool for water quality management. Use of this tool was considered carefully during the present study. It was not recommended, because it is not only extremely powerful, but also extremely unpredictable. Any adjudication of water rights -- whether surface or groundwater -- normally carries with it the possibility of extreme economic consequences to existing users, coupled with extreme uncertainty. It is not clear what solution would be mandated by the Courts -- whether it would be a physical solution that was within the means of current users or a solution that would solve the water quality problem by reducing the amount of water available for irrigation to an extent that crop production in the Pajaro Valley would be reduced materially.

A water rights adjudication would have additional economic impacts in the Pajaro Valley, since the defendants in the suit -- which, by law, would be all users except those using minor quantities of water -- would individually or collectively have to retain legal counsel for a court suit that could easily extend over a number of years or even a decade.

The current level of knowledge about the extent of the salinity problem or the rate at which concentrations of salts are moving inland, together with the possibility of an alternative solution -- water from the San Felipe project -- did not justify use of an extreme solution at this time.

The final alternative that was considered for the sea water intrusion problem was creation of a sea water intrusion barrier. The planning program for the Santa Cruz County Waterwater Facility recommended an exploration of the cost-effectiveness of injecting reclaimed wastewater from the Watsonville sewage treatment plant into the ground to create a barrier against sea water. A preliminary estimate of the total cost of the injection barrier (expressed as present worth rather than total dollars) was approximately $46,000,000. The magnitude of this cost suggests that a physical barrier should be considered only if other alternatives -- particularly a new water supply -- prove to be infeasible or to have adverse impacts. Nonetheless, the Section 208 plan should endorse a preliminary study of the intrusion barrier. Such a study was estimated to cost between $150,000 and $200,000, of which 87½ percent would be eligible for federal and state funding.

VIII. CASE STUDY ON PROTECTION OF GROUNDWATER RECHARGE AREAS

Case studies to evaluate the role of urbanization in diminishing groundwater recharge were carried out in the Pajaro Valley, Carmel Valley and the San Lorenzo Valley. The technical recommendations for the three study areas were quite similar, as are the institutional recommendations.

A. Summary of Institutional Requirements

The three case study areas differed significantly in terms of hydrologic characteristics, current patterns of urbanization and future pressure for urbanization. For example, recharge of the groundwater in the Pajaro Valley occurs predominantly outside of the stream beds, while in the Carmel Valley, most recharge occurs within the stream channel of the Carmel River and its tributaries. Nonetheless, the same implementation program was determined by AMBAG staff to be generally applicable to all three areas. The implementation program recommended:

- Site-specific development standards and controls by:
  - Requiring clustering of the densities that would be permitted under the basic zoning, so that areas of high recharge potential are preserved,
  - Limiting the amount of impervious surface that would be permitted,
  - Mandating the presence of an adequate drainage system,
  - Providing for aquifer recharge protection in local ordinances, and
  - Requiring that a geologists' report be prepared that considers subsoil properties;
- More general development regulations that:
  - Provide for flood plain zoning where lands subject to flooding also have high recharge value,
  - Identify wetlands or other lands with open space values that also protect recharge areas,
  - Coordinate general plan and zoning policies to channel future development to areas of low recharge value.

All of the implementation programs are well within the established authority, existing practice and technical capability of the relevant cities or counties (Monterey and Santa Cruz Counties, Cities of Carmel, Scotts Valley and Watsonville). No additional institutional arrangements are necessary to implement the strategies. The technical analysis prepared by AMBAG's consultants (23) did not produce enough data to identify the relationship between urbanization in recharge areas and quality of the groundwater as a critical water quality issue. Accordingly, governmental powers or procedures to require the adoption of mitigation measures by the separate general governments do not appear to be appropriate. Supportive measures can be made available by AMBAG, such as have already been accomplished through the strategies described below and the model ordinances described in this report, Section V, and in the Appendix.

B. Techniques of Aquifer Recharge Regulation and Management

1. Approach to Aquifer Recharge Regulation and Management

The recommended approach to recharge regulation and management is based on resolution of two overriding issues: 1) the potential for land use control and provision of improvements under zoning and subdivision review processes; and 2) the extent to which technical information supports the proposed policies and regulations.

The major findings of the case study make it clear that the most feasible and workable approach is control of land alteration. Three useful regulatory devices are:

- Provision of open space or pervious surfaces;
- The control of disturbance of natural vegetative cover; and
- The control of grading.

It is recommended that development be directed away from areas of high recharge potential totally and that different intensities of development controls be included in which higher density development is prohibited in high recharge areas. Recommendations also have been made for flood plain zoning, wetlands open space, stream impact and other similar land use controls. These latter areas of regulation should be considered secondary because of less direct benefits.

Many recommendations made in the AMBAG water quality management plan for the Monterey Bay region have similar locationally specific implications. In few instances are there direct conflicts between the objectives of reducing erosion and sediment, eliminating septic system pollution, avoiding sea water intrusion, encouraging aquifer recharge and nonpoint source pollution control. Hence, one land use control approach would be a system of overlay natural resource protection or conservation zones. Such zones would have an increasing level of intensity of development and other variations. Three such districts might be sufficient to achieve the land use goals plus the variations in land alteration. It is likely that alteration allowed could range from one to 35 percent, creation of impervious surfaces from one to 30 percent, and permissible grading from zero to 25 percent.

The advantage of such a system is its simplicity. Many additional combining districts, each with a separate set of variations, would not be superimposed upon one another. In this way, each zone would have two elements, an urbanization zone and a resource conservation zone. No zone would be complete unless it had both elements.

There are several other regulatory approaches which could be used to achieve the goals of aquifer recharge. The imposition of performance standards or "end-of-the-pipe" regulation could be imposed, i.e., "development cannot divert more than x percentage of flow." This may require greater sophistication than now exists in the state of technology. Assessment of diverse impacts of various types at different locations of development may necessitate the issuance of a permit. It is possible that some form of administrative permit, such as Ecological Capability Permit, might include considerations relating to water quality as well as other natural resources and environmental protection concerns.

The subdivision ordinances for each of the jurisdictions should be modified to assure that under the "drainage" requirement specifically authorized in state law, specific standards are imposed. These should consider broadly the kind of drainage, as well as the transmission of stormwaters. Under Section 66483 of the Government Code, there is authorization to impose a requirement for payment of fees for deferring the costs of constructing planned drainage facilities for removal of surface and stormwaters from local or neighborhood drainage areas. Again, were the definition of "drainage" to include transfer of such stormwater to recharge areas, the cost of the facilities involved could be transferred directly to the subdivider and new resident. In the absence of such a broad interpretation of the term "drainage", it is unlikely that the specific improvements called for could be required under subdivision law.

Two other provisions of the Subdivision Map Act should be noted. One deals with criteria for disapproval of subdivisions in Section 66747, which says that the city or county "shall deny approval" of a final map if it finds that the design of the subdivision or proposed improvements "is likely to cause substantial environmental damage or substantially and avoidably injure wildlife or other habitat".

In an amendment in 1975, a new requirement was imposed which calls for a specific plan in rural areas, under the Business and Professions Code, Section 11000.5, and requires the plan for a proposed "land project," defined as a subdivision with 50 or more parcels, located in an area in which there reside less than 1,500 registered voters within the subdivision or within two miles of the boundary of the property. Although there are not many such locations in the proposed recharge areas, there may be some in which this requirement applies, and could be strictly enforced. The specific plan as mandated in state law provides a high level of specification in location of land uses and other improvements, and has direct regulatory effects which supersede basic zoning.

2. Legal Issues

There are several basic legal issues regarding the extent to which the state zoning law can be applied to achieve the objectives for recharge area protection. These will be resolved based in part upon the extent to which there is an adequate technical basis. To put it quite simply, the regulation must be reasonably related to a goal which is considered protectible under the Constitution and state legislation.

California zoning has responded to new needs and demands, e.g., aesthetic zoning, growth control and zoning for low-income housing. Occasionally, the courts have attempted to draw lines beyond which zoning cannot go to achieve its normal purposes -- the separation of uses for avoiding incompatibilities and encouraging mutually supportive land uses. The field of environmental natural resource preservation law is emerging. It remains conjectural whether the courts will consider this to be a fully protectible goal of zoning.

Subdivision regulation has typically been concerned about provision of necessary facilities and utilities and appropriate layout of lots. However, with the recent interest in the environment, additional criteria for rejection of subdivisions are included in the state law. This gives somewhat more authority to local government to ensure full protection of the environment and conservation of natural resources.

Another basic issue, especially troublesome in utilizing a voluntary model ordinance approach, is whether similarly situated landowners will be treated equally. If, in the AMBAG region, some jurisdictions attempt to enact model ordinances, while others which have similar characteristics do not, the system may be defective, particularly if a landowner is prevented from pursuing a profitable activity which an adjacent owner in another jurisdiction can pursue.

Many landowners confronted with severe regulation object on the grounds that it would reduce the value of their property. It is evident that California courts do not consider reduction of value a serious obstacle. The closest analogy would be the major restrictions on bay filling imposed by the Bay Conservation and Development Commission, attacked in the courts and upheld. However, in that case, there was a strong legislative statement of goals and intent, presently lacking for Section 208 water quality plans in California.

IX. THE LANDFILL LEACHATE CASE STUDY

A special study was undertaken by AMBAG's water quality consultant to investigate the effects of the Buena Vista Solid Waste Disposal Site and an adjacent landfill facility operated by the City of Watsonville on the nearby surface and groundwaters (31). The intent of the investigation was to determine, on a case study basis, the effects of the leachate that flows from the disposal sites to surface or groundwaters, and the contribution of these sites to the concentration of nitrates in the groundwater.

A detailed investigation was made of landfill operations and flow characteristics of the leachates, which led to the conclusion that:

- Both landfills could generate substantial volumes of leachate during dry years as well as during years with normal rainfall;
- Leachate percolates to local perched water tables, and may be reaching the regional water table; and
- Leachate is emerging in surface water from both landfills.

Recommendations to correct existing problems at the landfills were made, including:

- Changes in operating practice that would reduce the volume of leachate;
- Collection and treatment or spray disposal of leachate that would otherwise reach Gallighan Slough; and
- Sampling and water quality monitoring, together with annual analysis for mineral and selected trace element chemistry at nearby wells utilized for domestic, institutional and food processing supplies.

The conclusions did not raise institutional or fiscal issues. The recommendations for changes in operation are reflections of good engineering practice that could be expected of the landfill operators, without need for any institutional or fiscal reorganization. There is adequate authority vested either with the Santa Cruz County Health Officer or the Regional Water Quality Control Board to regulate or abate any failure to comply with the recommended practices.

A preliminary estimate indicates that the costs to implement the recommendations for the Buena Vista site total $50,000. This cost should be considered exclusively a cost of landfill operation and can be financed in accordance with Santa Cruz County's Solid Waste Management Plan.

X. RECOMMENDATIONS FOR THE TWO-COUNTY REGION

The recommendations for regionwide solutions to water quality problems in Monterey and Santa Cruz Counties are based in large part on a generalization of the conclusions from the case studies that were presented in the preceding sections. As noted previously, they may differ from recommendations for specific cases, since the case study recommendations were carefully tailored to the exact circumstances of the case. The regionwide solutions are intended to be more generally applicable with some possible decrease in responsiveness to individual circumstances.

The regionwide solutions are described for each of the subject areas that were considered. Many of the recommendations are applicable to more than one functional area of water quality management. Overlap and multiple responsiveness are noted.

The discussion of recommendations for each of the functional water quality areas is preceded by an overall recommendation for a continuing Section 208 Water Quality Management Program.

A. The Organizational Concept for the Ongoing Section 208 Planning Process

The recommended institutional and fiscal arrangements for implementing the 208 program place maximum reliance on existing governmental powers and capabilities of local governments in the AMBAG area. Additionally, maximum reliance is placed on the technical capabilities of existing institutions, such as the Regional Water Quality Control Board (RWQCB), the California Department of Water Resources and the U.S. Geological Survey.

The Association of Monterey Bay Area Governments provides a regionwide and comprehensive viewpoint that is expressed primarily in the roles of coordinator and evaluator of the effectiveness of the Section 208 Plan in meeting water quality objectives.

The recommended organizational concept for implementing the Section 208 Plan and monitoring its effectiveness can best be described by summarizing separately the responsibility for four major aspects of the ongoing planning process.

1. Goal Setting and Plan Development

The first step in the ongoing Section 208 process was that of developing the Section 208 Plan itself. This aspect of the total process was accomplished cooperatively by AMBAG and by county and city governments in the region, with technical input from federal, state and local operating agencies. From an institutional standpoint, the primary lesson to be learned from the process of developing the Plan was that AMBAG was, in fact, able to function as a coordinator and a facilitator, and to deal with issues that are both highly technical and controversial.

Observation of the role that AMBAG played in developing the 208 Plan has strongly influenced the recommended role for AMBAG and for other agencies in the future steps of Plan implementation and monitoring.

2. Plan Implementation

The Section 208 Water Quality Management Program in general and the specific program appropriate to Monterey and Santa Cruz Counties are not "implemented" by means of a single decision or in a single step. In contrast, for example, to a waste treatment program, the comprehensive Section 208 Water Quality Management Program is implemented by a wide range of techniques ranging, in some instances, from major facility construction to modest changes in streetsweeping practices.

The Plan elements for the AMBAG region, in fact, are characterized by a general avoidance of major programs requiring large capital expenditures. Instead, the steps (summarized subsequently) in actually implementing the Plan:

- Can by and large be described as extensions of existing programs or practices that are already being carried out by general-purpose governments or special districts in the AMBAG region;
- Do not require major capital expenditures or operating cost increases; and
- In many cases, can be associated with an equitable source of financing that is directly related to the program itself -- a factor that is discussed subsequently.

The conclusion that the individual elements of the Section 208 Water Quality Management Plan are extensions of existing governmental powers and programs leads directly to the conclusion that existing established local governments should be responsible for implementing the Section 208 Plan. No instances were identified wherein a regionwide solution was either technically or institutionally superior.

The generalization that existing local governments are entirely capable of implementing the Section 208 Program may be subject to revision if agencies who are designated as responsible for implementing one or another element of the program in fact decline to accept this responsibility. For example, the recommendation is made in the following section that the California Department of Water Resources accept responsibility for groundwater monitoring and technical analysis of the results of the monitoring program. If this responsibility is not accepted by the Department of Water Resources, for whatever reason, then it will be necessary to prepare a revised institutional recommendation as part of the ongoing Section 208 Program.

3. Compliance and Enforcement

A number of the key elements in the Section 208 Program for the AMBAG region are "regulatory", in the sense that they depend on the power of government to regulate land use, to abate hazards to the public health, or to regulate the quantity and quality of waste discharges. The regulatory powers that would be required of any agency to implement the 208 Program were compared with the powers and technical capabilities of existing state and local governments. In every instance, the responsibility for observing whether "regulations" were, in fact, being complied with, and taking appropriate remedial action if they were not, could be assigned to an existing local or state agency.

Each of the elements of the Section 208 Program that involves a "regulatory" component is identified in the following subsection, and the responsibility and techniques for monitoring for compliance are described. As a summary:

- Responsibility for enforcement of all regulations related to land use or development standards would remain with the county or the city having jurisdiction over the land area. As discussed subsequently, each local government would, in order to be in compliance with the Section 208 Program, adopt appropriate ordinances that were substantially in accord with the policies or model ordinances developed during the Section 208 Program;

- Enforcement of management practices and procedures that can be implemented by local governments (e.g., streetsweeping practices, techniques to avoid erosion problems or correct problems that have been allowed to occur previously, etc.) would be the responsibility of the local government;

- Enforcement of public health standards (e.g., nitrate levels in well water, adequate maintenance of septic tanks) would remain with the county health agencies (Additional responsibilities could be assigned to subregional entities -- e.g., the governing body of an on-site wastewater disposal zone could require the use of proper maintenance practices -- but final responsibility for compliance with public health standards would remain with the health departments.);

- Responsibility for monitoring quantity or constituence for all liquid waste discharges from both point and nonpoint sources would remain with the Regional Water Quality Control Board. As discussed subsequently, a request for additional funding by the Regional Board through the state legislative budget process should be supported by the Association of Monterey Bay Area Governments if it is the conclusion of the Regional Board that the current staff and budget are inadequate to this responsibility.

4. Monitoring for Plan Effectiveness

The previous paragraphs dealt with responsibility for enforcing the standards and requirements included in the Section 208 Program. "Monitoring for effectiveness" has a broader concern. Are the standards and requirements included in the 208 Program adequate to the basic Section 208 objectives of maintaining and improving water quality in the region? In other words, the Section 208 Water Quality Management Plan was based on a conclusion that certain actions would accomplish the water quality objectives. This conclusion must be subjected to continuous review and to a continuous monitoring program.

It is recommended that AMBAG have the principal responsibility for coordinating and, in most instances, carrying out a program of monitoring to determine whether the 208 Program is meeting its objectives. In certain instances (e.g., monitoring groundwater pollution), the technical work would be delegated to another agency. The AMBAG governing body would have the ultimate responsibility for determining whether the objectives of the 208 Program were being met or whether the water quality management strategy should be revised.

AMBAG is the appropriate agency to perform monitoring and evaluation for the following reasons:

- It has a regional perspective and yet is subject to the policy guidance of locally elected officials;

- It can provide a perspective that is separated from day-to-day operating problems;

- Its status and powers are such that it must ultimately obtain a consensus, rather than immediatelly establish "requirements"; and

- It can offer economies in the evaluation process, because experience gained in one part of the region can be applied elsewhere in the region.

The responsibility for monitoring for Plan effectiveness is a demanding one, considering both technical and institutional factors. In several separate subject areas (e.g., groundwater quality, control of saltwater intrusion), there is technical uncertainty about the justification for major revisions in practices. The recommended implementation strategies appear to be effective, but may or may not prove out in practice. As a specific example, it was concluded that regulation of the use of fertilizer as a means of controlling nitrate penetration to the groundwater could not be justified at the present time. Instead, a program of education in agricultural practices could and should be implemented. The effectiveness of the educational program -- or the conclusion that agricultural practices have already changed to the point that use of fertilizer is no longer a contributor to the nitrate problem in groundwater, but that the effects of improved practices are only now becoming apparent -- must be the subject of further observation. If, in fact, the groundwater monitoring program leads to the conclusion that the situation is not improving, then it will be necessary to make the difficult recommendation that more stringent measures -- presumably regulatory measures -- be implemented.

A second aspect of the importance of a formal program of monitoring for effectiveness relates to a basic aspect of the water quality management strategy. Model ordinances were developed as part of the 208 effort, but the Section 208 implementation strategy stopped short of including a stipulation that these ordinances be adopted verbatim by each city and county in the AMBAG region. Instead, the ordinances were designed to be "performance guides", relevant portions of which would be adopted in substance by jurisdictions to which the policies and requirements applied. The ordinances themselves could be modified to local circumstances and preferences.

This implementation strategy is far more than "voluntary compliance" nonetheless. A major aspect of the 208 Program's implementation strategy is that, for a local government to be substantially in compliance with the Section 208 Plan, it is necessary that the local jurisdiction's ordinance include a substantive equivalent for all applicable regulatory policies that were included in the model ordinances. A jurisdiction's erosion control ordinance need not be comparable in form to the model ordinance, but the applicable items must be comparable in substance. A jurisdiction's plan for remedying erosion problems associated with completed public works projects will not be specified in detail as part of the Section 208 implementation program. Failure of the local jurisdiction to adopt and adhere to such a program will be a specific evidence of noncompliance with the Section 208 Plan. One of AMBAG's principal responsibilities will be to report, annually, the extent to which each jurisdiction in the two counties is carrying out its responsibilities under the 208 Plan, and the extent to which the Plan, considered as a composite of all its elements, is meeting water quality objectives.

B. Implementing the Section 208 Water Quality Management Plan

As noted previously, the Regional Water Quality Management Plan was developed on the basis of insights gained during the case studies. The actual implementation strategies or actions that were recommended for adoption can be classified into five categories:

- Enacting ordinances that affect water quality;
- Constructing and operating public facilities;
- Enacting and enforcing liquid waste discharge standards;
- Conducting education programs; and
- Monitoring and evaluating various aspects of water quality.

Certain of these actions and 208 Plan elements directly affect or support attainment of water quality objectives related to more than one water quality problem area. Table X-1 shows the extent to which each of the Plan elements would help solve one or more identified water quality management problems.

Table X-2 summarizes the manner in which the organizational concepts described in the previous subsection are applied to each of the elements in the recommended 208 Plan.

The following paragraphs discuss the institutional implications of each of the Section 208 Plan elements.

1. Ordinances Related to Water Quality Control

Enacting and enforcing the regulatory policies contained in the model ordinances developed during the Section 208 Program is one of the key elements in the overall Section 208 Plan. The regulatory policies themselves have been discussed in Section V of this report. The present discussion deals with the meaning of the "requirement" to adopt the policies or model ordinances and, thus, be in compliance with the Section 208 Plan.

The regulatory policies and model ordinances are intended to serve as performance specifications, rather than as detailed language that is applicable to each and every city or county in the AMBAG region. Further, there are elements of the model

Table X-1

THE EFFECT OF SECTION 208 PLAN ELEMENTS ON WATER QUALITY PROBLEMS

ACTION	EFFECT OF THE ACTION ON EACH WATER QUALITY PROBLEM AREA						
	Maintenance of Lakes and Estuaries	Septic Tank Management	Erosion and Sedimentation Control	Groundwater Quality	Saltwater Intrusion	Groundwater Recharge	Control of Landfill Leachate
REGULATORY POLICIES AND ORDINANCES RELATED TO WATER QUALITY CONTROL							
Erosion control ordinance	Primary		Primary			Supporting	
Development controls & standards	Primary		Primary			Primary	
Watercourse protection ordinance			Primary			Primary	
Septic tank management ordinance	Supporting	Primary		Supporting			
CONSTRUCTION AND OPERATION OF PUBLIC FACILITIES							
Sediment traps & comparable facilities	Primary		Primary			Supporting	
Streetsweeping	Primary		Supporting				
Repair of erosion damage	Primary		Primary				
Landfill operation standards	Primary			Primary			Primary
Operation of municipal treatment facilities	Primary			Primary			
LIQUID WASTE DISCHARGE STANDARDS							
Dairy waste standards				Primary			
Feedlot discharge standards				Primary			
EDUCATION PROGRAMS							
Agricultural best management practices							
- Groundwater quality				Primary	Supporting		
- Erosion and sediment control	Primary		Primary			Supporting	
Employee Training	Primary		Primary			Supporting	
Septic tank maintenance practices	Supporting	Primary		Supporting			
MONITORING AND EVALUATION							
Lake maintenance plan	Supporting						
Groundwater monitoring				Primary	Supporting	Primary	Supporting
Evaluation of septage disposal sites		Primary		Supporting			Supporting
Evaluation of water supply alternatives for Pajaro Valley					Primary	Primary	

NOTE: "Primary" = "Primary Strategy"; "Supporting" = "Supporting Strategy".

Table X-2

RESPONSIBILITY FOR IMPLEMENTING THE SECTION 208 PLAN

Plan Element	Responsibility for	
	Implementation	Compliance and Enforcement
REGULATORY POLICIES AND ORDINANCES RELATED TO WATER QUALITY CONTROL		
Erosion control	Cities and Counties	Cities and Counties
Development controls and standards		
Watercourse protection		
Septic system regulations		
Well water quality		
CONSTRUCTION AND OPERATION OF PUBLIC FACILITIES		
Sediment traps and comparable facilities	Appropriate Local government (e.g., City, District, JPA)	Operator
Streetsweeping		Operator
Repair of erosion damage		Operator
Landfill operation standards		RWQCB
Operation of municipal treatment facilities		RWQCB
LIQUID WASTE DISCHARGE STANDARDS		
Dairy discharge standards	Private operator	RWQCB
Feedlot discharge standards	Private operator	RWQCB
EDUCATION PROGRAMS		
Agricultural best management practices	Farm Advisors	Not applicable
Septic tank maintenance practices	SWRCB	Not applicable
Training in erosion and sedimentation control techniques	Cities and Counties, SCS, RCDs, Farm Advisors	Not applicable
MONITORING AND EVALUATION		
Lake maintenance plan	City or County	Not applicable
Groundwater monitoring	State Dept. of Water Resources	Not applicable
Evaluation of water supply alternatives for groundwater recharge	Two-county task force	Not applicable
Monitoring the effectiveness of the Section 208 Plan	Cities, Counties, AMBAG	Not applicable

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LEGEND:

"AMBAG" = Association of Monterey Bay Area Governments.
"JPA" = Joint Powers Authority.
"RCDs" = Resource Conservation Districts.
"RWQCB" = Regional Water Quality Control Board.
"SCS" = U.S. Soil Conservation Service.
"SWRCB" = State Water Resources Control Board.

ordinances that are clearly inapplicable to some of the local governments, and there are numerous instances in which one or another regulatory approach would a priori be effective in meeting water quality objectives.

It is the specific intent of the Section 208 Program that the model ordinances be viewed as guides. The performance requirements implied by the regulatory policies should be substantially incorporated into the ordinance of each city and county, but:

- Maximum flexibility in form and content of the ordinance is encouraged;
- Policies that are inapplicable to circumstances in a particular jurisdiction should be excluded.

In some cases, ordinances of adjoining jurisdictions should be coordinated as to requirements. Provisions related to protection of groundwater recharge areas and erosion control are conspicuous examples, since a failure by one jurisdiction to enact or enforce compatible ordinances may compromise the effectiveness of the ordinances in an adjoining jurisdiction. Instances in which coordinated ordinance development and compatibility of requirements are essential to the objective of the Section 208 Plan should be identified as part of the ongoing Section 208 Plan maintenance process. AMBAG should evaluate the question of compatibility when it certifies that an ordinance is in compliance with the Section 208 Plan.

There will certainly be instances when two or more local governments would gain by a cooperative effort to produce and adopt the required ordinances. AMBAG should serve as a source of information and coordination, and should encourage joint efforts or the use of task forces to deal with common problems.

A jurisdiction will be in compliance with the intent of this element of the Section 208 Plan if it adopts a substantially complete ordinance within two years after the date of adoption of the Section 208 Plan. AMBAG's governing body would make a finding that the jurisdiction's ordinances are in substantial compliance with the Section 208 Plan's regulatory policies. The detailed drafting of the ordinances and the enforcement of the provisions of the ordinances would be a responsibiity of each city and county in the region. Over the longer term, AMBAG could comment on the way in which the ordinances are enforced in practice and the extent to which they appear to serve water quality objectives.

2. Construction and Operation of Public Facilities

As a general statement, the institutional arrangements for operating public water quality facilities are either already established or are an appropriate subject for a local, rather than regional, decision. For example, municipal percolation ponds in the Salinas Valley were identified as a contributor to nitrate pollution of the groundwater. The local governments that operate these facilities have adequate technical and legal capacity to deal with the problem and the Regional Water Quality Control Board has the statutory authority to establish and enforce water quality standards. No additional authority or institutional mechanisms are necessary.

In some cases (e.g., water quality management strategies for lakes), institutional arrangements must be established. The optimal institutional arrangements -- as measured by the standard of technical efficiency and acceptability to the governments and citizens that are involved -- may vary throughout the region.

The case studies illustrated a number of concepts that are available for consideration, including:

- Joint exercise of powers agreements between established local governments;
- Use of special districts that, in fact, involve little or no extension of governmental powers, since the governing body would consist of city and county officials, the responsibilities for design and operation would be met through contract with a city or county department and, in effect, the district would be used as a mechanism to allocate financial responsibility to the area that is benefited;
- Use of a more autonomous special district with appropriate powers, if this arrangement was more responsive to local circumstances or attitudes.

In any case, there is no single institutional model for operating the public facilities that are a part of the Section 208 Plan. Existing local governments with the advice and concurrence of the appropriate Local Agency Formation Commission can establish the institutional mechanisms that are technically and fiscally appropriate and acceptable to the participants.

The following paragraphs provide additional commentary about the different types of facilities or other operations that are included in the Section 208 Plan.

Sediment traps and comparable facilities were recommended in the case studies of Laguna Grande and Roberts Lake and may be appropriate in other areas for protection of lakes, watercourses or groundwater recharge areas. Construction and operation of such facilities does not pose any particular institutional problem. One or another of the institutional alternatives considered for the Laguna Grande and Roberts Lake case studies may be applicable.

Streetsweeping, using best management practices, is recommended as part of the Section 208 Plan for each jurisdiction in the region. This effort can be implemented independently by the responsible local governments, although opportunities for equipment sharing were identified during the case studies. Adequate lines of communication exist between local officials in both counties to permit the assumption that efficiencies in the purchase and use of vacuum streetsweepers or other equipment will be achieved where they exist and are administratively feasible.

Repair of erosion damage, according to an established plan and expenditure program, is a somewhat novel element of the AMBAG Region Section 208 Plan. After appropriate surveys, a classification would be prepared by both counties and by each city, specifying existing public works projects or other facilities where problems of erosion and sedimentation had become apparent. The classification would be expected to be complete and inclusive of all public lands and public projects, including projects that had originally been the responsibility of state or federal agencies. (An exception to this mandatory inclusiveness would be projects located within the boundaries of Fort Ord or on U.S. Forest Service lands. AMBAG would be expected to take advantage of established lines of communication with Fort Ord's Commandant and with other officials to encourage their voluntary participation in a program leading to correction of existing erosion damage.) After existing erosion problems have been identified, each jurisdiction would prepare a specification and cost estimates for remedying erosion damage on lands under its control. The technical resources of the U.S. Soil Conservation Service and the local Resource Conservation Districts would be expected to be available to this effort. The local jurisdictions would then prepare long-term expenditure programs that were fiscally realistic, given the jurisdictions' resources, but that corrected the identified problems over a time period not greater than 15 years after adoption of the Section 208 Plan.

Erosion control problems that were within the boundaries of local government, but not subject to that government's jurisdiction (e.g., problems that arose because of previous freeway construction practice) would be identified in the jurisdiction's plan for correcting erosion damage. The responsible governmental agency would be encouraged to take corrective action within the 15-year period. AMBAG would be expected to note lack of compliance with the Section 208 Plan requirement, while carrying out any appropriate function involving the responsible jurisdiction. Responsibility for carrying out the program would remain with the local government having jurisdiction.

Landfill operation standards that will prevent discharges to the groundwater, to rivers or to estuaries are well established and understood. The Regional Water Quality Control Board has adequate authority to establish standards and monitor for compliance. The Section 208 Plan deals with the problems of landfill operations that may affect water quality by the recommendation that the Regional Board enforce appropriate standards and that the local government operating the landfill comply with these standards and adopt the appropriate management practices.

No additional institutional arrangements are required.

Operation of municipal treatment facilities includes both treatment plans and on-site disposal using septic tanks. Responsibilities and authorities for these functions are well established. The local governments in the two counties have both the technical and the fiscal capacity to operate waste treatment plants where this is the appropriate approach to wastewater management. The County Health Officers and the Regional Water Quality Control Board have adequate, well established authority and capability to deal with problems of public health in one case, and of water quality in the other. The case study on septic tanks describes additional organizational arrangements or regulatory requirements that may be applicable in areas other than those that were the subject of the case studies.

3. Liquid Waste Discharge Standards

The AMBAG Section 208 Plan depends largely on regulations to control discharges from feedlots and dairies that eventually reach the groundwater. The Plan also depends on regulation to solve any groundwater quality problems from municipal treatment facilities. Emerging policy of the Regional Water Quality Control Board (17) calls for full use of existing authority to regulate sources of pollutants that have traditionally been given lesser priority than point or nonpoint discharges into streams, rivers, estuaries, etc. Adequate authority and adequate policy commitment now exist within the State Water Resources Control Board and the Regional Water Quality Control Board to make such a dependence upon regulatory approaches quite realistic under the circumstances.

4. Education Programs

Two separate programs of education in best management practices are major elements of the AMBAG Section 208 Plan.

An intensive education program for farmers and farm operators evolved as the most practical interim action, pending further technical studies on the relationship between nitrates in the groundwater and fertilizer practices, irrigation practices and other agricultural practices. A range of other alternatives is discussed in the case study (Section VI), but there was little support -- either technical or political -- for a stringent regulatory approach in the absence of a consensus that agricultural practices were primary sources of groundwater pollution. In fact, there is a possibility that changes in practices over the last several years have eliminated fertilizer as a source of pollution, but sufficient time has not yet passed to make this apparent.

In the absence of a clear justification for regulatory approaches, the Section 208 Plan depends on a continuation of established educational programs conducted by the Farm Advisor in each county. Specialized technical instruction may be made available by a number of sources, including the U. S. Soil Conservation Service, the Resource Conservation Districts, and the local junior colleges. Seminars may be conducted by officials from the State Department of Water Resources or the state or regional water quality agencies. Primary responsibility for education and agricultural practices would remain with the Farm Advisor in each county.

The other major education program would be concerned with a wide-ranging subject matter, dealing basically with soil management practices and use of the natural capabilities of the soil to support water pollution control programs. These education programs relate specifically to the recommendations for sophisticated measures to control sedimentation and for effective planning, design, implementation and maintenance of septic tank systems.

As discussed in Section V, the requirements for education to implement and manage the sedimentation control ordinances and correct existing erosion damage require considerable expertise at levels ranging from senior administrators and technical specialists to inspection personnel. Adequate expertise and knowledge already exist in the AMBAG region, particularly through the resources of the Soil Conservation Service, the local Resource Conservation Districts and the California Department of Transportation. AMBAG can serve as a facilitator in bringing together the available expertise and the individuals in local government who will be responsible for implementing the erosion control and soil management practices.

Technical support for improved septic tank management would be provided by means of one or a series of formal training programs held in the Region. The State Water Resources Control Board is considering developing a course in septic system maintenance. In the absence of a state-supported and funded course, it would be possible to contract with the community colleges. Actual out-of-pocket costs for specialized courses at the junior college level are very nearly covered by the state subsidy. A final recommendation on training and septic tank management is deferred, pending a conclusion about whether the state board will be supporting such educational services.

5. Planning, Monitoring and Evaluation

The AMBAG Section 208 Water Quality Management Plan should recommend ongoing technical studies of two separate types. First, instances occurred during Plan preparation where available resources did not permit a complete technical evaluation of a water quality issue. It is necessary to carry out or complete studies as part of the ongoing program. Second, as noted earlier, a program of monitoring the effectiveness of the Plan in meeting water quality objectives and taking remedial action, if necessary, is a major element of the Section 208 Plan.

An additional "planning requirement" -- discussed previously -- is that cities and counties establish a plan and expenditure program for remedying existing erosion problems.

Lake maintenance plans are to be developed by the involved local governments for those lakes that were not the subject of a case study during the initial Section 208 planning program. The recommended lead agency and other involved jurisdictions for each of the lakes in the two-county region are summarized in Table X-3. Lake maintenance plans should be completed within one year following adoption of the 208 Plan and implementation should begin immediately thereafter. It is anticipated that the lake maintenance plans would be of the same level of technical detail as the plans produced for Laguna Grande and Roberts Lake. AMBAG can serve as a coordinator and facilitator in establishing joint programs between the agencies designated in Table X-3.

Recharge area protection plans should be prepared for the North Coastal, Aptos/Soquel and Salinas areas, and additional evaluation should be completed for the San Lorenzo and Carmel Valley watersheds. The results of these studies would be expected to lead to appropriate modifications in the jurisdictions' subdivision ordinances, as discussed in Section VIII. The jurisdictions in each basin which should carry out the recommendations for recharge area protection are:

- Santa Cruz Coastal Basin - Santa Cruz County;

Table X-3

RESPONSIBILITY FOR PREPARING LAKE MAINTENANCE PLANS

Lake or Estuary	Responsible Agency	Participating Jurisdictions
Schwans Lagoon	Santa Cruz County	
Corcoran Lagoon	Santa Cruz County	
Moran Lake[1]	Santa Cruz County	Capitola
Soquel Creek Lagoon	Capitola	Santa Cruz County
Watsonville Slough	Santa Cruz County	Watsonville
Pinto Lake	Santa Cruz County	Watsonville
Lake El Estero	Monterey	
Salinas River Lagoon	Monterey County	
Carmel River Lagoon	Monterey County	Carmel

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[1] A management plan is currently being implemented by Santa Cruz County.

- San Lorenzo Valley Basin - Santa Cruz County and Scotts Valley, with the City of Santa Cruz involved in all planning and development of recharge protection programs, as they depend upon the Basin for their water supply (If significant annexations are made, the City may be required to implement the other recommendations as well.);

- Aptos-Soquel Basin - Santa Cruz County, with Capitola involved in planning and program development; may also be subject to development controls if they annex;

- Pajaro Valley - Santa Cruz and Monterey County, and Watsonville;

- Salinas Valley - Monterey County, Salinas, Gonzales, Soledad, Greenfield, King City and Marina; and

- Carmel Valley - Monterey County, Seaside and Del Rey Oaks, with Carmel, Monterey and Pacific Grove cooperating in planning and research. Carmel is in a low recharge area and contains little undeveloped land, therefore, is not included as an implementing agency. This could change if significant annexations were made.

A groundwater monitoring plan for the region has been recommended in (21), Chapter XII. This monitoring program is crucial both to the long-term resolution of the controversy about the origins of nitrates in the groundwater and the urgency of action to solve the problem of saltwater intrusion to the groundwater. The additional cost of the recommended program is a fairly modest $20,000 per year. The program would take advantage of the continuing efforts of the agencies that are now carrying out major groundwater monitoring programs in the two counties, including:

- California Department of Water Resources;
- The Health Officers of Monterey and Santa Cruz Counties;
- Monterey County Flood Control and Water Conservation District;
- Santa Cruz County Flood Control and Water Conservation District; and
- Santa Cruz County Watershed Manager's Office.

The State Department of Water Resources is recommended as the lead agency in the more extensive monitoring program, although the technical capabilities and efforts of the other agencies are also essential. The Department of Water Resources is in a position to budget the additional funds for the effort, both because of its long-term commitment to water quality monitoring in the AMBAG region, and because the monitoring program may have important statewide benefits as a demonstration program. If, in fact, the technical uncertainties about the origin of groundwater pollution cannot be resolved within the next several years, the Department of Water Resources would be an appropriate agency to carry out a more detailed monitoring and groundwater modeling program. Such an effort would have important statewide and national benefits and would be the appropriate subject for a major, federally supported research program involving federal financial participation, as well as the cooperative activities of relevant agencies, such as the U.S. Geological Service and the U.S. Environmental Protection Agency.

An evaluation of water supply alternatives for groundwater recharge is a necessary additional study that should be carried out as part of the continuing Section 208 Program. The research and analysis completed to date indicates that the most practical approach to salinity control is to import additional water from outside the region. Such a decision has important indications for land use and development patterns in both counties. Further, the efforts to date did not include an economic evaluation of agricultural water use from such potential sources as the San Felipe Project.

It is recommended that a major water resource study be carried out under the leadership of a board of control, in which the following agencies would be represented:

- Monterey County Planning Department;
- Santa Cruz County Planning Department;
- Monterey County Local Agency Formation Commission;
- Santa Cruz County Local Agency Formation Commission;
- Monterey County Flood Control and Water Conservation District;
- Santa Cruz County Flood Control and Water Conservation District;
- Santa Cruz County Watershed Manager's Office;
- California Department of Water Resources;
- U.S. Army Corps of Engineers;
- U.S. Bureau of Reclamation;
- U.S. Environmental Protection Agency;
- U.S. Geological Survey; and
- Association of Monterey Bay Area Governments.

The leading alternative for salinity control appears to be groundwater recharge, using imported water. An alternative against which this leading alternative could be compared would be an adjudication of existing water rights to eliminate overdraft of the groundwater. This alternative was discussed in Section VIII of the present report.

Monitoring the effectiveness of the Section 208 Plan is a major responsibility assigned to AMBAG. This effort is intended to assure, on a continuing basis, that the 208 Plan meets its objectives. AMBAG would certify that, in fact, local jurisdictions adopted ordinances that incorporated the 208 Plan regulatory policies and took the other actions required by the Plan. The monitoring function would also include serving as a coordinator of technical task forces who would be assembled from time to time to evaluate whether water quality objectives were being achieved. For example, the strategy that was adopted to deal with the problem of nitrates in the groundwater depended primarily on educational programs, plus a continuing groundwater quality monitoring program. If, over time, the monitoring program indicates that the problem is becoming more severe, it will be necessary to redirect the strategy and to consider other alternatives, including regulation of agricultural practices, limitations on water use, etc.

The following specific responsibilities are assigned to AMBAG:

- Negotiate and update, as required, joint work plans with the Regional Water Quality Control Board, the State Department of Water Resources, the Board of Control responsible for the evaluation of water sources for seawater intrusion control, and all local agencies carrying out further studies mandated by the 208 Plan;

- Update population and land use projections, and coordinate use of these projections in regional water quality, water supply, air quality, solid waste and transportation planning programs;

- Carry out a continuing performance evaluation of the 208 Plan, including an environmental, social and economic impact assessment;

- Prepare the biennial revision of the 208 Plan;

- Serve as an initiator or coordinator of grant applications and demonstration program applications related to water quality planning and nonpoint source pollution management; and

- Review and comment on the continued effectiveness of the Section 208 implementation strategies, including a consideration of the impact of changes in the ordinances, regulations and management practices of local agencies.

The standards and procedures to be used by AMBAG in evaluating and monitoring the effectiveness of the Section 208 plan will vary over time. Much of the initial evaluation will be procedural. Has a jurisdiction modified its ordinances, and do the modifications appear to comply with the intent of the proposed regulatory policies? Are lake maintenance plans being prepared according to the adopted schedule? Is the availability of federal grants keeping up with the expectations on which the plan was based?

Over the longer term, the standard for evaluation will be the water quality objectives of the 208 Plan itself. Technical studies of the type done during the initial 208 program will have to be repeated, in part, to determine whether the water quality strategies, once implemented, are effective in practice.

During both the short and the long term, AMBAG's role as a coordinating agency and its responsibility for A-95 reviews will facilitate the evaluation process. Significant actions of local governments that could affect Section 208 objectives and that are subject to A-95 review can be evaluated at the time of review, with respect to conformity and consistency with the adopted Section 208 Plan.

Both the timing and the content of major technical studies will emerge as the affected jurisdictions in the two counties gain experience in actually implementing the Section 208 Plan.

XI. FINANCING THE REGIONAL SECTION 208 PROGRAM

To a certain extent, the financing program for implementing the Section 208 Plan cannot be specified until federal appropriations have been established for the ongoing Section 208 program. Nonetheless, general financing principles and guidelines can be adopted as part of the AMBAG Section 208 Plan.

The most basic financing principle is that the schedule for implementing the Section 208 Plan should be tied directly to the availability of funds. In particular, priorities for planning and implementation should be revised continuously, as part of the process of updating the Section 208 Plan, to reflect a realistic short-term estimate of the amount of grants that may be available from the EPA Section 208 program. Unavailability of federal grant support would not necessarily lead to a Plan revision, but it would certainly lead to a change in schedule and priorities.

Other financing principles are presented in the following paragraphs, after a summary of the sources of financing.

A. Sources of Revenue

While major portions of 208 program implementation depend on availability of federal grants, these grants must be matched, in part, with local funds. Other ongoing efforts may not be eligible for grant funding. The discussion of revenue sources begins with a summary of local revenue sources that may be available, and then summarizes the major grant programs.

1. Local Revenues and Charges

Local general fund revenues (e.g., property taxes, sales taxes) can be used to finance the locally funded portion of the Section 208 program. Competition for these funds is so intense that maximum reliance should be placed on other locally collected charges that can be related directly to the objectives of the 208 program.

a. Development Fees

Local governments in California are increasingly using "development fees", or charges levied at the time a project is constructed, to recover the cost of public service infrastructure. Another appropriate term for such fees might be "homeowner fees", since they are passed forward by the developer and paid, entirely or in large part, by the first buyers of developed property. In fact, development fees are paid twice or more, in the sense that:

- Fees passed forward are reflected directly in higher prices for homes and other properties;
- A significant portion of a new home purchase is normally financed by homeowner debt; and
- Considering repayment of principal and interest, every $1 of a conventional home loan results in total payments on the order of $2.70 to $3.00.

Nonetheless, development fees are a perfectly appropriate financing mechanism if the owner of the new property is clearly the beneficiary of the service.

For example, revised land use standards have been proposed to solve erosion/sedimentation problems. Control measures would include revised grading/erosion control ordinances, revised roadway paving standards, revised development standards that would require stormwater catch basins in new projects, and the encouragement of cluster developments.

The cost of enforcing the new ordinances and the costs of the newly required catch basins could be recovered through the use of a schedule of development or permit fees established at the option of local government.

Development fee structures may take various forms, each with their own particular incidence characteristics. Alternatives include:

- Graduated charges in proportion to the value of construction;
- Graduated charges in proportion to the size (square feet of the unit); and
- Incentive fees that reward development designed to minimize adverse water quality impacts. For example, a groundcover incentive fee would reward plantings that would achieve goals of erosion and sedimentation control.

The cost of compliance with revised ordinances has not been the subject of a detailed study during the present program. It may be that the cost implications of the ordinances may cancel each other. For example, the costs to the new homeowner associated with development fees may be offset by the economies associated with cluster development.

b. User Fees

User fees are traditionally used for "public enterprises", such as water supply, solid waste collection and increasingly, because of federal policy, liquid waste treatment. They are entirely appropriate for ongoing costs of water quality control for nonpoint sources of water pollution, but in most cases, there are practical problems in identifying the "users" who benefit from the various water quality measures. User fees would be entirely practical in selected instances, such as:

- For maintenance of septic systems; and
- For use of groundwater (if further research confirms that incentives to limit use of groundwater is the most practical and equitable approach to the saltwater intrusion or nitrate penetration problem).

2. Federal Grant Programs for Water Quality

The federal Clean Water Act of 1977, administered primarily by the U.S. Environmental Protection Agency (EPA), provides for matching grant funds for a variety of programs, including:

- Construction of treatment facilities for municipal and industrial wastewater;
- Improving lake water quality;
- Agricultural best management practices;
- Installation of on-site wastewater disposal systems; and
- Areawide wastewater planning.

The fiscal 1978 allocations of funds are preliminary figures; appropriations are not final at this time. Nonetheless, the following programs are the core source of financing for the 208 program.

Municipal and Industrial Wastewater Treatment. The AMBAG 208 program has identified percolation from municipal and industrial wastes as a contributing factor in the excess amount of nitrates found in the groundwater. One suggested solution is the disposal of wastewater by irrigation. Costs for such a program would be eligible for federal funds under the Clean Water Act of 1977.

Grant funds cover 87.5 percent of the cost of planning (Step 1), design (Step 2) and construction (Step 3) of wastewater facilities. Federal contributions cover 75 percent of the cost, and state funds cover 12.5 percent of the cost. The 1977 amendments to PL 92-500 have increased federal funding levels to 85 percent for municipal facilities which employ innovative or alternative wastewater treatment processes. The Clean Water Grant program is administered by the State Water Resources Control Board.

Clean Lakes Demonstration Grants. Various techniques for improving the quality of lakes were suggested in the Laguna Grande/Roberts Lake case study, including dredging and sealing the bottom of the Laguna, aerating Roberts Lake and/or Laguna Grande, installing a sediment trap at Del Rey Oaks or in Laguna Grande, and stabilizing the sand dunes with plantings.

Costs associated with these types of solutions would be eligible for partial funding through the Clean Lakes Demonstration Grant program of the U.S. Environmental Protection Agency. This program provides up to 50 percent of the costs associated with projects that control water pollution in publicly owned freshwater lakes.

Allocations for fiscal year 1978 are $16 million. These funds are not allocated by region, but are distributed on a "first come, first serve" basis. Awards for fiscal year 1977 ranged from $37,000 grant award for aeration in Lafayette Reservoir to a $1.35 million grant for Ellis Lake. This year, $1 million has been awarded for dredging and correction of mercury pollution in Lake Gibraltar. A primary focus of this program has been on a "double-barrel" approach, combining water quality improvement with increase in public access to lake shores. Funds have been awarded for purchase programs for lake shore buffer zones.

Grants for Agricultural Best Management Practices. The Clean Water Act of 1977 authorized the Secretary of Agriculture (with the concurrence of the administrator of the U.S. Environmental Protection Agency) to act through the Soil Conservation Service and enter into contracts with owners and operators of rural land, who would then install and maintain measures incorporating best management practices to control nonpoint source pollution. The term of the contracts is to be not less than five years nor more than 10 years. The U.S. Government may fund up to 50 percent of the total cost of the measures set forth in the contract and, in certain circumstances, may fund a greater percentage. The authorized (but not yet appropriated) budget for fiscal year 1978/1979 is $200 million. Where practical, the program is to be administered by "...soil conservation districts, state soil and water conservation agencies or state water quality agencies...." The Section 208 management agency must assure "...an adequate level of participation by owners and operators having control of rural land...."

Thus, for the first time, agricultural best management practices will be eligible for federal financial support.

Grants for On-Site Wastewater Disposal. As noted previously, the Clean Water Act of 1977 authorizes funding of up to 85 percent of the cost of improving on-site wastewater disposal systems. Eligibility for this program depends upon a finding that an on-site system is more effective in economic, social and environmental terms than construction of a sewer system.

Areawide Waste Treatment Program (208). The Clean Water Act of 1977 provides matching funds for 75 percent of planning costs for the continuing planning process for areawide waste treatment management planning. Plans for areawide planning for abatement of point and nonpoint sources of water pollution must be completed within three years. Fiscal year 1978 funds allocated are $69 million. The final appropriations are not available at this time.

3. Agricultural Stabilization and Conservation Service Grants

Agricultural discharges from feedlots and dairies have been identified as contributing excessive amounts of nitrates to the groundwater. Structural solutions, such as lined evaporation ponds, are eligible for cost-sharing grants from the Agricultural Stabilization and Conservation Service, in cooperation with the Soil Conservation Service, U.S. Department of Agriculture.

Cost-sharing grants of 50 percent are available to individual farmers for costs of approved practices. Maximum grants to individual farmers are $2,500. Grants to a maximum of $10,000 are available through "pooling" arrangements. These "pool" ranges are for costs of shared activities, such as irrigation ditches which are jointly owned by agricultural producer groups.

4. Land and Water Conservation Fund Grants

Costs for land purchased for recreation and for development of recreation facilities such as picnic areas, and for support facilities such as roads, are eligible for development grants from the Bureau of Outdoor Recreation (BOR), U.S. Department of the Interior, under the authority of the Land and Water Conservation Fund (LWCF) Act of 1965 (PL 90-401). Administration of the LWCF program in California is delegated to the State Department of Parks and Recreation. This important financial source for recreation projects may have a significant role for water quality in the AMBAG region, in that:

- Coordinated plans for lake preservation and recreation facility development at lakes may lead to eligibility for joint funding by BOR and EPA; and

- Current EPA policy gives high priority to preservation of lakes with significant recreation potential.

5. University of California Cooperative Extension

The AMBAG 208 Program has identified needs for education and training programs in various areas, including such programs as those available through the University of California Cooperative Extension.

As discussed in Section VI, the University of California Cooperative Extension is committed to joint programs with local governments.

The Director of Cooperative Extension has broad discretion as to how the agency's extensive budget ($27 million in 1976/1977) will be allocated to alternative research and training programs. It is entirely realistic to assume that a tangible indication of local support, combined with both a significant technical problem and an instance where conclusions could be expected to be transferable, would generate considerable assistance from Cooperative Extension.

B. Financing the Elements of the Section 208 Program

This section may repeat information presented elsewhere in this report. The information is included here to offer -- in one place -- a summary of the financial implications of the Section 208 program.

The evaluation of available sources of revenue led to an evaluation of financing plans for each element of the Section 208 program. As noted previously, the financing plan identifies sources, but not timing, since federal priorities and appropriations for Federal Region IX have not yet been established.

1. Financing the Ongoing Section 208 Program

Plan Maintenance. The principal source of financing for activities related to maintaining the Plan and monitoring its effectiveness should be continuing grants under the U.S. Environmental Protection Agency. The level of funding available from EPA has not yet been established, but any reasonable forecast indicates that funds would be available to permit AMBAG to carry out the responsibilities designated in the previous section. For planning purposes, it should be assumed that ongoing responsibilities within AMBAG for 208 Plan maintenance and monitoring would require 2.5 person-years per year, full-time equivalent and an approximate total annual cost of $80,000. Staff might consist of designated individuals, but a preferable arrangement would be to assign Section 208 responsibilities more broadly in AMBAG. Comprehensive planning considerations could be brought to bear on water quality problems by virtue of the fact that (for example) an individual with responsibility for maintaining AMBAG's housing element of its regional plan would also be involved in the question of alternative water sources for salinity control.

The recommended 2.5 person-year equivalent is in addition to staff or contributed services that may be available from other agencies. Similarly, additional staff could be funded from successful applications for additional grants or demonstration programs.

The $20,000 local share implied by an $80,000 total cost of Plan maintenance and monitoring could be treated as a "general fund" item in AMBAG's annual budget, funded by local membership contributions.

It would be possible to formulate an additional schedule of charges to agencies that are not members of AMBAG, but benefit from maintenance of the 208 Plan (e.g., the waste treatment agencies). A set of "user charges" is not recommended at the present time, because of the more fundamental recommendation that only a modest level of funding is required.

A final comment about funding for Plan maintenance is that the major responsibility of AMBAG -- and one that should receive management as well as technical attention -- is that of assuring full participation of the region in any future demonstration projects, grant programs or other sources of funding that could be devoted to water quality objectives. This responsibility is also appropriate to AMBAG, in functional areas other than water quality.

Planning, Monitoring and Evaluation. The sources of financing for the recommended continuing planning or monitoring functions are summarized in Table XI-1. The effort to develop maintenance plans for those lakes shown in Table X-3 would be eligible for funding under the continuing Section 208 Program. The local share could be the subject of cost-sharing arrangements between the responsible agency and the other participating jurisdictions. The estimates of total cost of preparing a plan for each lake are appropriate, since many of the technical inputs can be provided by public works officials, planning officials, etc. as part of their continuing responsibilities.

If possible, the groundwater monitoring program (with an identified additional cost of $20,000 per year) should be funded by EPA or the California Department of Water Resources. If this

Table XI-1

FINANCING SOURCES FOR THE ONGOING MONITORING AND EVALUATION FUNCTIONS

Planning Function (In order of relative importance)	Cost (1978 dollars)	Financing Sources	Responsible Agency
1. Evaluating 208 Plan Effectiveness (includes related tasks: grant seeking, work plan development, technical assistance to local agencies)	$100,000[1]	$75,000 EPA; 25,000 AMBAG	AMBAG
2. Study of Pajaro Valley water supply alternatives[2]	55,000	25,000 EPA; 30,000 Local	Two County Task Force
3. Groundwater monitoring plan	20,000[3]	15,000 EPA or California Department of Water Resources 5,000 Counties	Counties or California Department of Water Resources
4. Agricultural Demonstration Research Project	Depends on scope of program	University of California Agricultural Extension; Counties at least 5,000 each	Two County Agricultural Task Force
5. Erosion Control Plans[4]			
a. Urban area planning	250,000[5]	187,500 EPA, 62,500 cities and counties	Cities and Counties
b. Public road improvement planning	60,000[5]	45,000 EPA; 15,000 cities, counties and state	Cities, counties, state (CALTRANS)
c. Rural (farmland) area planning	1,750,000[6]	1,319,250 EPA; 430,750 Resource Conservation Districts	5 Resource Conservation Districts in AMBAG area
6. Recharge Protection Plans[7]			
a. Pajaro Valley	10,000	7,500 EPA; 2,500 local	Monterey and Santa Cruz Counties (lead)
b. San Lorenzo Valley	75,000	56,250 EPA; 18,750 local	Santa Cruz County (lead)
c. Carmel Valley	60,000	45,000 EPA; 15,000 local	Monterey County (lead)
d. Salinas Valley	60,000	45,000 EPA; 15,000 local	Monterey County (lead)
e. Aptos - Soquel	70,000	52,500 EPA; 17,500 local	Santa Cruz County (lead)
f. North Coast (Santa Cruz Co.)	70,000	52,500 EPA; 17,500 local	Santa Cruz County
7. Lake Maintenance Plans[8]			
a. Schwans Lagoon b. Corcoran Lagoon c. Watsonville Slough d. Pinto Lake	50,000	37,500 EPA; 12,500 local	Santa Cruz County (lead)
e. Soquel Creek Lagoon	20,000	15,000 EPA; 5,000 Capitola	Capitola (lead)
f. Lake El Estero	15,000	11,250 EPA; 3,750 Monterey	Monterey
g. Carmel River Lagoon	15,000	11,250 EPA; 3,750 Monterey County	Monterey County (lead)

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[1] FY78-79 costs; although future costs are not identified, this is intended to be a continuing function.

[2] To be completed by July 1980.

[3] $20,000 is the estimated annual cost. Several years of monitoring will probably be necessary.

[4] The three erosion control planning functions (5a,b,c) are not prioritized here. Instead, erosion control planning projects should be prioritized by problem severity.

[5] This is the total cost of plans to be completed over a two year period, by July 1980.

[6] This is the total cost of plans to be completed over a thirty year period.

[7] To be initiated by July 1979. Costs shown represent total costs. The groundwater basins (6a-f) are listed in priority order.

[8] To be initiated by July 1979. Costs shown represent total costs. The lakes are not listed in order of study priority. It is intended that available lake management planning funds be provided in order of application and commitment of local matching money.

Source: Association of Monterey Bay Area Governments funding source is not forthcoming, AMBAG can negotiate with the other agencies identified previously as being active in groundwater monitoring to determine whether additional efforts can be financed by them.

A thorough evaluation of alternative sources of water supply for groundwater recharge raises a number of complex issues and will require a major study effort. Pending further discussions with the suggested participants in such a study, the recommended source of financing is $25,000 from the ongoing Section 208 planning funds and $30,000 in cash or services from the agencies participating in the study.

Ordinances Related to Water Quality Control. Adapting the regulatory policies or model ordinances to local circumstances was assigned as an appropriate responsibility for the cities and counties in the region. In view of the fact that significant progress has already been made in developing the model ordinances, it is recommended that adaptation to local circumstances can be accomplished as part of the continuing activities of city and county planning and public works departments. The cost of enforcing ordinances could be recovered by use of a schedule of development or permit fees, established at the option of the local government.

It should be understood that the cost of compliance with revised ordinances has not been the subject of a detailed study during the present program. As noted previously, cost implications of the ordinances may tend to cancel each other. For example, the cost of stricter erosion control and construction management procedures may be offset by economies associated with cluster development. Insofar as there are additional costs because of the need to comply with the various ordinances, it should be anticipated that such costs will be directly reflected as a higher price for housing or other development in the affected areas.

Liquid Waste Discharge Standards. Under the AMBAG Section 208 Plan, the Regional Water Quality Control Board is responsible for enforcement of all water quality standards -- including those involving nonpoint pollution sources. To a great extent, the use of enforcement procedures depends on the relative potential for harm of different sources of pollution, considering both cost of enforcement and the damage that would result from a lack of enforcement. If current budgets are determined by the Regional Board to be inadequate, a budget augmentation can be sought as part of the annual budget process.

Education Programs. Inquiries made during the present project indicate that the current budgets of the Farm Advisors in both counties are adequate to support an expanded educational program related to fertilizer and irrigation practices. If local contributions totaling approximately $10,000 could be appropriated by the Boards of Supervisors of both counties, it can be anticipated that the University of California Cooperative Extension would be in a position to make significant technical resources available, in excess of the resources that are already available. One possible increased involvement of the University would be to support a demonstration project exploring whether more detailed use of specialists (e.g., soil scientists, irrigation specialists, plant pathologists, etc.) would allow the farmer to produce equivalent or greater yields with a lesser application of either fertilizer or irrigation water. If one or more demonstrations were successful with one or more crops, farm operators would not depend permanently on the University, but would take advantage of private laboratories and technical advisory services that are generally available in California.

2. Financing the Actions to Maintain Laguna Grande/ Roberts Lake

The costs and recommended financing sources for the maintenance of water quality at Laguna Grande/Roberts Lake are summarized in Table XI-2. As noted previously:

- Interagency financing arrangements for local costs should be the subject of negotiation by the members of the Joint Powers Authority, not the subject of an AMBAG recommendation; and
- Preservation strategies and costs will vary for the other lakes listed in Table X-3 or XI-1.

With those qualifications, the financing plan shown in Table XI-2 can be expected to be generally applicable for the other lakes in the AMBAG region.

3. Financing Septic System Maintenance

The recommendations made by AMBAG staff relating to septic systems were designed to produce a net savings in private costs through:

- Extended life of septic systems and avoidance of in-service failure;
- Reduced maintenance costs through proper design practices and scheduled maintenance; and
- Avoidance of charges for community collection systems and treatment plants.

Table XI-2

COSTS OF THE RECOMMENDED STRATEGY FOR LAGUNA GRANDE/ROBERTS LAKE

	Public Cost [1]		Financing			
			EPA	Local Share		
Pollution Control Measure	Initial Cost [2]	Operation & Maintenance	Clean Lakes Grant (Capital Only)	Capital	Operation & Maintenance	Private Costs
Dredge Laguna Grande	$ 320,000		$ 160,000	$160,000		
Dredge Roberts Lake	130,000		65,000	65,000		
Seal Laguna Grande	12,000		6,000	6,000		
Stoplog outlet, Roberts Lake	5,000		2,500	2,500		
Aerate Laguna Grande	3,000	$ 300	1,500	1,500	$ 300	
Aerate Roberts Lake	3,000	300	1,500	1,500	300	
Vacuum Sweep Streets	20,000[3]		10,000[3]	10,000		
Catchbasins	≤1,000 ea.	≤50 ea.		1,000 ea.	50 ea.	
Pave Driveways	Minimal	Cost savings				Depends on Owners' Design Preferences
Sediment Trap	260,000[4]	5,000	130,000	130,000	5,000	
Management Plan for Existing Urban Erosion	15,000 (To develop plan)			15,000		
Grading/Erosion/Sediment Control Ordinance	Minimal	25,000[5]			25,000[5]	
Cluster Development/Roadway Standards	Minimal	12,500[5]			12,500[5]	12,500[5]
Sand Dune Stabilization	12,000	1,000	6,000	6,000[6]	1,000[6]	
Improved Bird Habitat/Roberts Lake	Minimal	Minimal[7]				
Park Litter Control	Minimal	Minimal[7]				
Park Layout	Unestimated	Minimal[7]				
TOTAL	≤$ 781,000+	≤$ 44,150+	$ 382,500	$398,500+	$ 44,150+	$12,500+

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[1] All costs are in 1977 dollars.

[2] Included under this heading are capital construction costs and one-time costs associated with the development of guidelines/regulations.

[3] This is the incremental cost to purchase a vacuum-type sweeper instead of a conventional sweeper; actual purchase price is $55,000. No change in operation and maintenance cost from conventional to vacuum sweeper.

[4] A decision must be made on where to locate the sediment trap. To reach this decision, the JPA should negotiate with Del Rey Oaks to determine a purchase price for the Del Rey Oaks site. If the purchase price is less than the difference in construction costs between the two site options, then the Del Rey Oaks property would be the logical choice for placement of the trap.

[5] Cost to enforce ordinances; these costs could be recovered by imposition of a permit fee schedule. Also, it is expected costs of enforcing this ordinance will be offset by a reduction in public works cost associated with off-site sediment build-up.

[6] From California Department of Parks and Recreation.

[7] Costs will generally be small increment of tasks normally conducted by park personnel.

Source: Association of Monterey Bay Area Governments and McDonald & Grefe, Inc.

The long-term savings may involve initial private and public costs. The private costs associated with septic system design practices that were recommended by AMBAG staff would be incurred at the time that the septic system is installed. The initial costs per system were estimated to be:

- Installation of septic tank risers - $100 to $200;
- Installation of dual leach fields - $500; and
- Installation of inspection risers - $50.

In addition, AMBAG staff estimated that presale inspection might cost as much as $100 per septic system.

A major private cost -- that of installing the entire septic systems in new developments -- may be eligible for federal funding. As noted previously, on-site systems are eligible for up to 85 percent federal funding, provided that a finding has been made that on-site systems are preferable from the standpoints of cost compared to effectiveness and environmental impact.

Public costs are associated with four classes of recommendations.

Early Action. Costs of approximately $2,200 have already been incurred as part of the public information program that AMBAG included in the Section 208 Early Action Program. These costs were to support the printing and distribution of a Guide for Septic System Maintenance.

Training. Financing for a training program in septic tank maintenance may be available from one of two sources. If the State Water Resources Control Board initiates a training program, it can be anticipated that state financing would be available. (Salary and related costs of the participants would presumably be borne by their employing organizations.) In the absence of state funding, the community colleges have indicated a willingness to undertake appropriate training programs. The incremental costs of a short course are often very nearly equal to the state subsidy.

Inspection. The incremental cost of inspecting septic systems at the time of installation (in contrast to scheduled inspections of installed systems or presale inspection of installed systems) is extremely small. Installation practices can be monitored as part of the building inspection/building permit process, although staff capability may depend on completion of the recommended training programs.

On-Site Wastewater Disposal Zone Capacity. A major advantage of the on-site wastewater disposal zone (OWDZ) concept is that a determination would be made of the septic system capacity of the entire zone, rather than dealing with the capacity of individual sites on a case-by-case basis and not being able to consider the possibility of cumulative effects. There would be significant economies if areawide or countywide assessments of capacity could be accomplished at one time, presumably through contract with an appropriate specialist. An initial order-of-magnitude cost estimate indicates significant economies if the analysis were accomplished for a large geographic area. For example, costs of a determination of capacity in the San Lorenzo Valley were estimated preliminarily to be on the order of \$10,000-\$20,000, while a countywide assessment could be accomplished for \$50,000 (or a total cost in both Santa Cruz and Monterey Counties of \$100,000). It can be anticipated that this expenditure would be eligible for EPA/State Water Resources Control Board funding, since it would be a planning cost associated with an areawide waste treatment "facility". Financing the local share of the grant program could be accomplished through the County's general fund, but an alternative for at least a portion of the local share should be considered. The enabling legislation for OWDZs requires a finding on capacity to be made by the Regional Water Quality Control Board, as well as by the County Health Officer. A comprehensive approach, rather than an assessment of each zone on a piecemeal basis, could demonstrably reduce the costs that would be borne by the Regional Board, and the Regional Board might fund all or a portion of the local share.

4. Financing the Erosion/Sedimentation Control Strategy

A detailed estimate of the cost implications of the erosion control strategy is not available. Nonetheless, a financing plan can be described in terms of recommended principles. The process of embodying the regulatory principles described previously in local ordinances and of enforcing these ordinances, once enacted, is primarily a city or a county function. A financing plan for the necessary costs is a matter of local discretion. It should be noted again that adoption and enforcement of ordinances is not viewed as a "new" responsibility, but as a continuation of responsibilities related to planning and building inspection. Responsibilities are increased -- and a greater responsibility for training and technical assistance, as well as "enforcement", is imposed, so it must be anticipated that costs will increase. Local jurisdictions may decide to fund any increased costs from the same revenue sources that are now used to support planning, zoning and building regulation, or they may consider other alternatives such as:

- Development fees (which will largely be borne by purchasers of new developments);

- Development fees, together with incentives (e.g., a reduction in fees if ground coverage at a project is less than the maximum permitted by zoning); and

- Grant funding from the ongoing Section 208 Program.

The second major element of the erosion control program calls for local governments to encourage landowners to institute best management practices that will limit erosion, particularly on agricultural lands. In extreme cases, it may be necessary to resort to the authority of the Regional Quality Control Board to abate poor soil maangement practices, but emphasis is on positive and cooperative actions. As part of this process, local governments and AMBAG should publish widely the availability of financial support through the amendments to the Clean Water Act of 1977 (described previously). The authority of the Soil Conservation Service to enter into long-term contracts with landowners and to bear up to 50 percent of the cost of agricultural best management practices should be regarded as the major financing program for improvements in the private sector.

The final major element of the erosion control program calls for a long-term action program to correct erosion problems at existing public works projects, as well as to follow best management practices to prevent future problems or problems at new projects. The full financial implications of this recommendation will not be clear until each jurisdiction has completed its inventory of existing problems, but several financing principles can be established.

First, it should be noted that there may be a cost savings rather than a net increase in cost associated with correction of sedimentation problems. The expenditures necessary, for example, to correct erosion because of prior grading practices may produce a savings in drainage channel maintenance.

Second, it should be remembered that correction of existing problems often represents a redirection of Public Works Department priorities, rather than a new expenditure program. Finally, once the action programs have been developed by jurisdictions and programs of correction have been prepared, activities will be eligible for funding under the ongoing Section 208 Program.

The resource conservation districts who are already active in training and technical assistance programs have access to a tax rate of $0.02/$100 of assessed value of land only, within their boundaries. Districts that are not now levying their full tax rate have access to an additional source of funding to support technical assistance.

5. Financing the Nitrate Control Program

As noted in Section VI, the conclusion that control of nitrate pollution in the groundwater should, for the moment, emphasize education and demonstration projects largely removed from the need for extensive financial support. Means to finance the recommended education programs were described on page 122.

6. Financing the Saltwater Intrusion Control Study

For the moment, the AMBAG recommendation is that an evaluation be made of alternative sources of new water that could be used to recharge the groundwater and prevent further intrusion of saltwater. It was recommended previously in this Section that such an evaluation be funded $25,000 from the ongoing Section 208 Planning funds and $30,000 in cash or services from the agencies participating in the study.

7. Financing the Program to Protect Groundwater Recharge Areas

Table XI-3 summarizes the estimated costs and financing for each of the management recommendations that emerged from the aquifer recharge case study. Some of the recommendations for mitigation of recharge losses will add to administrative responsibilities and costs (such as development review, planning and research), and others will impose costs directly on the developer and home buyer (recharge facilities, soil tests). The public costs are identified in Table XI-3, but private costs are not. This is partially because of the many options for mitigating recharge loss and their site specificity.

A general analysis of the cost and effectiveness of recharge mitigation development practices indicates that alternatives for recharge may serve as alternatives to traditional drainage systems, with possible savings in downstream drainage facilities. Cost savings over conventional development practices may result.

Table XI-3 shows costs in each drainage basin, rather than by jurisdiction. The need for consistency within each basin dictates that the individual jurisdictions work closely in implementing the proposed program. The financial responsibilities of each jurisdiction should be worked out within each basin.

8. Financing Landfill Management

The cost to correct water quality problems at the Buena Vista Solid Waste Disposal Site -- estimated at $50,000 -- is directly

Table XI-3

ESTIMATED COSTS AND FINANCING FOR AQUIFER RECHARGE CASE STUDY

Recommended Management Practices	Recommended Implementation Program	Public Costs[1,2]		Funding Source	Responsible Agency	Costs per Basin					
		Initial	Annual			Santa Cruz Coastal	San Lorenzo	Aptos-Soquel	Pajaro	Salinas	Carmel
1. On-site mitigation through modified development practices (retention grading, pervious pavement, vegetative management, recharge pond, etc.)	1a. Subdivision ordinance modifications (definition of "drainage", soil tests and report).	1a. $12,000[5]	0	Counties and cities	Counties and cities		$ 1,000 plus $1,000-Santa Cruz County ($250/basin)	--	$ 1,000 $1,000-Monterey County ($500/basin)	$ 6,000	$ 6,000
	1b. Apply structural mitigation measures to to all urban development projects.	1b. 0	$200,000	Counties and cities (Development fees possible).	Counties and cities	$ 10,000 per yr.	$ 50,000 per yr.	$ 10,000 per yr.	$ 40,000 per yr.	$ 40,000 per yr.	$ 50,000 per yr.
2. Flood plain zoning	2-6. Use available recharge data when carrying out these planning tasks.	2. 0	0		Counties and cities	0	0	0	0	0	0
3. Wetlands open space		3. 5,000[8]	0	EPA 3,750 (from ground-water research and planning funding) Local 1,250	(Same)	750	1,000	750	750	750	1,000
4. Stream open space setbacks		4. 5,000[8]	0	(Same)	(Same)	500	2,000	500	500	1,000	500
5. Development of impervious areas		5. 5,000[8]	0	(Same)	(Same)	500	2,000	500	1,000	500	500
6. Clustered development		6. 5,000[8]	0	(Same)	Consider recharge data in the designation of areas suitable for cluster development.	500	2,000	500	500	500	1,000
7. Performance Standards		7. Undetermined[9]	--	---	Counties and cities	--	--	--	--	--	--

(Continued)

Table XI-3 (Continued)

Recommended Management Practices	Recommended Implementation Program	Public Costs[1,2]		Funding Source	Responsible Agency	Costs per Basin					
		Initial	Annual			Santa Cruz Coastal	San Lorenzo	Aptos-Soquel	Pajaro	Salinas	Carmel
8. Overlay zoning		8. 40,000[8,10]	0	Counties and cities	Counties & cities. Once additional information available from research programs, map recharge areas at level of detail similar to present.	4,000	15,000	4,000	7,000	5,000	5,000
9. Consider petitioning for sole source aquifer designation		9. 3,600[11]	0	Counties and cities		600	600	600	600	600	600
10. Groundwater research and planning.		10. 354,000[12]	0	258,750 EPA 86,250 local		70,000	75,000	70,000	10,000	60,000	60,000
TOTALS		$400,600[13]	$200,000			$ 84,850	$ 141,850	$ 84,850	$ 58,850	$ 112,100	$118,100

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[1] Private costs to be paid for by the developer or homeowner (for structural mitigations, additional soil tests and reports) are not included here. Costs would vary for each site and type of development, therefore are not readily generalizable.

[2] Estimates for public staffing costs based on $30,000 per person year for staff time, except where otherwise noted. All estimates are in 1978 dollars.

[3] Estimates per basin may need to be revised as more groundwater data become available.

[4] $1,000 for each implementing city and county. Cities of Carmel, Pacific Grove, Monterey, Capitola and Santa Cruz are excluded, as they are located in relatively insignificant recharge areas. If annexations of important recharge areas occur, implementation of recharge protection programs in their cities may be necessary.

[5] $40,000 per staff person per year, with five staff people needed to review the adequacy of each proposed urban development's projection of recharge. $40,000 is needed (rather than $30,000), due to the highly technical nature of the necessary review (training in soils, engineering, drainage and run-off control). The five staff per year were allocated to the basins as follows: Santa Cruz Coastal - 1/4 (little development occurring); San Lorenzo Valley - 1-1/4 (large, considerable development, recharge characteristics complex); Aptos-Soquel - 1/2 (small area); Pajaro Valley - 1 (very important to mitigate recharge losses), Salinas Valley - 1; Carmel Valley - 1 (relatively small area, but subject to development pressures and is Monterey Peninsula water source).

[6] This practice is an existing requirement. There are no additional costs incurred for consideration or recharge information.

[7] Incremental cost for considering existing recharge data; not total cost. Funded as part of the groundwater research and planning program (#10). Costs allocated between basins according to particular characteristics of each; for example, San Lorenzo Valley large; geologically and hydrologically complex so requires more planning time than other basins.

[8] Costs cannot be determined until research programs conducted.

[9] Staff time necessary to use detailed recharge data to prepare "recharge zone" maps for all the basins.

[10] One week of staff time for each basin for analysis of data to make recommendation on desirability of petitioning.

[11] To be spread over one to five years; includes costs for recommendations 2 through 6, as are planning needs.

[12] Costs for #2-6 (flood plain zoning, wetlands open space, stream open space setbacks, development of impervious areas, clustered development) are not added into total, as already part of groundwater research and planning cost.

Source: Association of Monterey Bay Area Governments associated with operation of a municipal enterprise. It can be financed from user fees unless alternative financing is suggested, as part of Santa Cruz County's overall Solid Waste Management Plan.

C. The Effects of the Jarvis-Gann Property Tax Limitation Initiative

In June of 1978, the voters of California will consider an initiative that would amend the State Constitution to:

- Redefine the concept of "full cash value", in the sense that the tax rolls will be based on market values for the 1975/76 fiscal year, with increases from that point limited to two percent per year, unless property changes hands, whereupon actual market value would be substituted, and where new construction since March 1, 1975 would be added to the rolls at its actual market value;
- Limit total property tax collections to not more than one percent of "full cash value" (as redefined) in any year;
- Allocate the total tax levies between local governments "according to law" where, presumably, enabling legislation would be enacted by the State Legislature if the Initiative is approved by the voters; and
- Require that new taxes be approved by two-thirds of the jurisdiction's "qualified electors" (a term not further defined in the Initiative).

A number of important issues (in addition to the question of whether the Initiative will be approved) are unanswerable at the present time. One issue is abundantly clear. Passage of the Jarvis-Gann Initiative would seriously limit locally derived, discretionary revenues and would raise considerable uncertainty about the ability of local governments in the AMBAG region to pay the local share of the grant programs on which the Section 208 financing plan is based.

The extent to which passage of the Jarvis-Gann Initiative might delay or prevent implementation of the Section 208 Plan varies considerably among the Plan elements. As a general statement, those Plan elements that are associated with the land development process or that can be associated with a narrowly defined group of beneficiaries are affected the least. Development fees or user charges could provide the necessary financing or the funds for local matching requirements.

Development fees would not be restricted by the Jarvis-Gann Initiative and, in fact, property owners paying one percent property taxes (instead of the current two or more percent) might be more able to pay development fees, since their annual property tax payments would be reduced substantially. It can be anticipated that, in an area of high housing demand, such as the AMBAG region, the market will respond to the increase in disposable income of homeowners by increasing the price of housing, but some or all of the increased purchasing power could be available for housing cost increases that will reflect development fee increases.

Elements of the Section 208 Plan that offer a general benefit and that would traditionally be financed from general revenues will be more significantly affected. It is general funds or discretionary revenues that will be under the greatest pressure if the Initiative is approved.

The lake maintenance program, including both completion of lake maintenance plans and plan implementation, would be set back significantly. The planning process and the physical and other solutions both provide a general benefit, and would normally be suitable for general fund financing from local governments, rather than from other revenue sources. Passage of the Initiative will almost certainly require a revision of the time schedule for completing the lake maintenance plans and implementing their recommendations.

The program for septic system management would not necessarily be affected by the Jarvis-Gann Initiative. The On-site Wastewater Disposal Zone that is recommended as the leading implementation strategy has the authority to levy what, in effect, are user fees. It is virtually certain that levies per dwelling unit or per connection to a septic tank would not be construed to be within the one percent Jarvis-Gann limitation. The alternative management strategy of requiring presale inspection is almost exclusively a private-sector transaction and does not involve public cost.

Control of erosion and sedimentation would be affected in a rather unbalanced way. Preparation of erosion control plans is to be financed with EPA grants. The matching funds for these grants would be subject to the increased competition for unrestricted revenues. Actual implementation techniques would be financed by the landowner, developer or ultimate buyer. The plans and programs to correct existing problems would be affected significantly, insofar as they depend on general fund financing.

One legal issue regarding the Jarvis-Gann Initiative may be resolved in a way that facilitates erosion control. There is some question as to whether the property tax limitation applies to local governments that tax some real property (e.g., land), but that do not tax all real property. An example is Resource Conservation Districts. If legal opinion eventually solidifies behind the conclusion that such entities are exempt from the one percent limitation, at least this minimal source of funding may be available to implement the erosion control plans.

The initial program related to nitrate concentrations in the groundwater would be affected significantly by the Jarvis-Gann Initiative. The recommended education programs would be financed primarily from State and federal funds, but a local contribution from the Counties was recommended as a way to encourage University of California Cooperative Extension to allocate resources to the nitrate problem in the area. The Initiative would affect the ability or the willingness of the Counties to make a contribution from local funds. Passage of the Initiative may also affect a long-term solution to the problem of nitrate concentration, since:

- It can be anticipated that, if an action program is ultimately recommended, this action program will be based largely on regulatory approaches; and

- Passage of the Jarvis-Gann Initiative -- particularly if passage is by a large majority -- would indicate a general dissatisfaction with local government and, by implication, significant resistance to regulatory approaches.

The Jarvis-Gann Initiative would affect only one of the two steps that are considered for control of sea water intrusion. The recommendation for a detailed engineering/planning study of new sources of water carries with it a requirement for a sizable local contribution. The sources of local financing would be affected negatively by passage of the Initiative. The other recommendation -- water conservation measures -- does not have a direct public cost and would not be affected adversely by the Initiative.

The effects of the Initiative on the recommendations for protecting groundwater recharge areas are similar to those for erosion and sedimentation control. Preparation of erosion control plans would be affected adversely, but actual implementation -- a process that depends on actions by the developer and payment ultimately by the homeowner or other property owner -- would not be affected.

Control of leachate intrusion at the sanitary landfills would be affected in the sense that the program would compete for scarcer local financial resources.

Since, ultimately, the control measures could be mandated by the Regional Water Quality Control Board, it can be anticipated that the recommendations would be implemented within a reasonable time, whether or not the Jarvis-Gann Initiative is enacted.

APPENDIX A

MODEL ORDINANCES

INTRODUCTION AND SUMMARY

BACKGROUND

The purpose of this report is to provide the AMBAG 208 Program with model ordinances for the control of erosion and sedimentation. The experience of existing programs to date has been one of limited success at preventing the occurrence or acceleration of erosion and sedimentation. Prior to presenting the model ordinances, a brief discussion of the erosion and sedimentation process, the adverse effects of the process and the specific areas of concern in the AMBAG 208 area is offered as background material.

Erosion and Sedimentation

Erosion is the process of wearing away the surface of the land by water, wind, ice, or other geologic agents. The following terms are used to describe the different types of water erosion:

- raindrop or splash--force of raindrops causes soil to splatter;
- sheet--water removes uniform layer of soil off the surface without gully formation;
- rill--water concentrates, forming small channels and eroding land several inches in depth;
- gully--water concentrates in narrow channels, eroding land as much as 100 feet in depth;
- streambank--water removes soil from banks and, to some extent, from stream bottoms;
- natural (or geologic)--water and other natural agents wear away earth's surface under natural environmental conditions of climate, vegetation, etc., undisturbed by man;
- normal--gradual erosion of land used by man which does not greatly exceed natural erosion; and
- accelerated--erosion much more rapid than natural or normal erosion, primarily as a result of land disturbing activities by man.

Man's activities, especially construction, have accelerated the process of erosion and its damaging effects substantially. For example, soil erosion of a square mile of land can increase from 2 ton/acre/year on agricultural lands to more than 40 tons/acre/year as the land is converted to suburban uses. Basically, the erosion is influenced by soil characteristics, land use, slope, ground cover, and rainfall characteristics.

Sedimentation is the accumulation of soil as a result of erosion. Over eons, natural sedimentation has completely changed rivers and coastal areas, formed valleys, and floodplains, etc., which have changed both plant and animal life. At the same time, it is necessary for maintaining the normal regimen of river systems and coastal areas which support complex biota, over a shorter time frame. However, urbanization has accelerated this phenomenon and led to undesirable impacts on the environment. Sediment is generally acknowledged to be the greatest contributor, by volume, to water pollution in the world. The Agricultural Research Service of the U.S. Department of Agriculture estimates 4 billion tons of soil material are washed into tributary streams each year. Of this total, about 50% originates from agricultural crop lands; 30% stems from geologic erosion; approximately 5-10% comes from forest and associated rangelands; and the remaining 10-15% derives from streambank erosion, surface mines, roadbanks, and urban, industrial, and highway construction. The amount of soil loss is related to storm magnitudes and on the amount of land disturbing activities in a watershed. In developing areas soil loss can be as much as 1,000-10,000 tons/square mile/year.

Adverse Effects of Erosion and Sedimentation

Given the high erosion rates and sediment yields from land disturbing activities, it is not surprising that a number of adverse impacts have resulted. Erosion is aesthetically displeasing; accounts for many dollars in loss of valuable topsoil, in increased agricultural costs, and in increased road and drainage maintenance costs; and induces increased rates of erosion and sedimentation. It is through the deposition of eroded soils that erosion imposes the greatest damage. The adverse effects of sediment include covering and ruining croplands, lawns, roads, and recreation areas; reducing hydraulic capacity in ditches, drains, and culverts; filling streams, lakes, and man-made water impoundments which reduces their storage capacity and increases flood potential; reducing the aesthetic and recreation value of water; and increasing the cost of filtering operations for municipal water supply reservoirs. Furthermore, sediment acts as a transport medium for other pollutants, especially nutrients, pesticides, and heavy metals, which adsorb to the eroded soil particles.

Erosion and Sediment Problems in the AMBAG Region

AMBAG's "Erosion and Sediment Control, Technical Report" (June, 1977) identified major erosion and sediment pollution problems in the AMBAG area. The report also presented a list of erosion and sediment control measures and identified existing control program. The major problems for the region are summarized below.

Existing Agricultural Problems:

- Vineyards--Sediments, in the runoff of rainfall and irrigation water from irrigated vineyards on sloping lands in the Gonzales-King City area, are polluting water in the Salinas River.
- Truck crops--Sediments, in the runoff of rainfall and irrigation water from irrigated truck crops on sloping land in the Salinas and Pajaro Valleys, are polluting water in the Salinas and Pajaro Rivers.
- Grains--Sediments, in the runoff of rainfall and irrigation water from irrigated and non-irrigated grain on sloping land in south Monterey County, are polluting water in the Salinas River.
- Orchards--Sediments, in the runoff of rainfall from non-irrigated orchards on hilly land in eastern Santa Cruz County, are polluting water in the Pajaro and other river systems.
- Rangeland--Sediments, in the runoff of rainfall from overgrazed rangeland throughout the AMBAG area, are polluting water in the area river systems. Notable sites are southeastern hills of the Salinas Valley, Hunter Liggett, Fort Ord, and the Carmel River Watershed.
- Woodland--Sediments, in the runoff of rainfall from logging activities on woodland in north Santa Cruz County, are polluting water in the San Lorenzo and other rivers.

Potential Agricultural Problem:

- Marginal land conversion--The conversion of marginal agricultural land from grass and/or grazing to a more intensive agricultural use, especially on sloping land, without runoff and erosion controls and a management program to fit the conditions, will increase erosion and sediment, and increase water pollution.

Existing Urban Problems:

- Moderate and extensive residential--Sediments in the runoff of rainfall from moderate and extensive residential areas on slopes and hills throughout the AMBAG area, are polluting water in the river systems. Notable examples are the Santa Rita-Prunedale area, Carmel Valley, Monterey Peninsula, Carralitos, Scotts Valley, Ben Lomond, and Boulder Creek.

- Intensive residential-municipal--Sediments, in the runoff of rainfall from intensive residential-municipal areas on slopes and hills, are polluting water in river systems. Notable examples are the Carmel-Monterey-Seaside area and the Aptos-Capitola-Santa Cruz area.

- Off-site flooding--Sediments, from off-site flooding and erosion caused by the runoff of rainfall from intensive residential-municipal areas on relatively flat land, are polluting water in drainageways and sloughs. Examples are the north Salinas area, and the Gonzales area.

- Horses--Sediments, in the runoff of rainfall from small parcels (1-5 acres) with horses throughout the AMBAG area, are polluting water in the river systems. Notable examples are the Carmel Valley, Laguna Seca, Santa Rita, Prunedale, Scotts Valley, Soquel, Aptos, Felton, and other similar foothill-type subdivisions.

Potential Urban Problems:

- Expansion and intensification--The expansion and intensification of urban areas without consideration of the overall hydrologic capabilities of drainage characteristics and facilities will cause off-site flooding, erosion and sediment that will pollute water.

- Slope and hill development--Urban development on slopes adn hills without adequate runoff and erosion control will cause sediment that will pollute water.

Other Existing Problems:

- Roads and road right-of-ways--Sediments, in the runoff of rainfall from roads and road right-of-ways throughout the AMBAG area, are polluting water in drains, creeks, rivers, and water bodies. All kinds of roads (city, county, state and private), particularly in the hills and mountains, contribute to the problem.

- Streambanks--Runoff of rainfall in streams is eroding stream banks and causing sediments that pollute water in the river systems and water bodies throughout the AMBAG area.

- Mines and quarries--Sediments, in the runoff of rainfall from mines and quarries scattered throughout AMBAG area, are polluting water in river systems.

Landslides--Sediments from landslides and landslips in the Santa Cruz County watersheds (some natural and some caused by man) are polluting the water in the river systems.

APPROACHES TO CONTROL

Existing Efforts

Most of the erosion and sedimentation problems created by man's activities can be controlled. In general there are two approaches to controlling the adverse effects of soil detachment, transport, and deposition. First, there are corrective measures which are designed to minimize the impact of the pollutant after it has already been generated. Alternatively, there is the preventive approach which stresses preservation of a watershed's drainage characteristics and protection of soil surfaces from erosive forces. This latter approch is predicated on man's ability to use and manage land in a proper manner. The various control measures which embody this preventive approach are called "best management practices" (BMPs). In addition, because BMPs stress prevention and are often nonstructural, they tend to be more cost effective than corrective measures.

To date erosion and sediment control in the AMBAG region have been accomplished on a voluntary basis or through development laws and ordinances. However, both corrective and preventive approaches have been ineffective at preventing the occurrence or acceleration of erosion and sedimentation. The lack of coordination among various governmental programs, laws, and ordinances and the absence of trained staffs that understand erosion and sedimentation control have major stumbling blocks.

Proposed Model Ordinances

In response to the need for a comprehensive program, this report presents three model ordinances dealing with erosion and sedimentation problems. The basic approach of these ordinances is preventive and requires implementation of many of the BMPs identified in AMBAG's "Erosion and Sediment Control, Technical Report" (June, 1977). The key ordinance is the Grading/Erosion/Sedimentaiton Control Model Ordinance, whose purpose is to regulate land activities and require the application of BMPs in order to preserve and protect the natural environment and the public safety from the adverse impacts of erosion and sedimentation. Separate ordinances have been set up for maintaining erosion control measures, and the keeping of livestock. The ordinances have been designed to give local jurisdictions considerable discretion in implementing the ordinances. Basically, they are based on a system of permits which regulate land activities and are administered by an appropriate city of county department. The standards section for the Grading/Erosion/Sedimentation Control Model Ordinance has purposefully been made lengthy to permit flexibility in choosing appropriate standards for any given jurisdiction. Only the standards and basic procedures for the other model ordinances have been provided as it is expected most jurisdictions would integrate them into existing ordinances.

SUMMARY

In this report, three model ordinance are presented. They are designed to conserve soil and water resources and prevent and control accelerated soil erosion and sediment damage to land, water, and other resources in the AMBAG 208 region. They cover the following areas:

- Grading/Erosion/Sedimentation Control
- Maintenance of Erosion/Sediment Control Devices
- Keeping of Livestock

The need for improving existing governmental and legislative efforts in erosion and sedimentation control provides the impetus for the ordinances. As man's activities on the land become increasingly disruptive, the impacts associated with erosion and sedimentation become more and more detrimental. The approach adopted in the ordinances is to prevent such adverse effects through the application of best management practices.

In drafting these ordinances, a primary consideration is to provide local entities with the maximum amount of flexibility in adapting them to existing ordinances. In order to accomplish this flexibility, sections such as performance bonds, abatement procedures, and appeals are left relatively vague so that local jurisdictions can reference existing codes that cover those subjects. The section on standards is exceptionally lengthy in order to allow any given jurisdiction the flexibility to select appropriate standards. Furthermore, the definitions of terms such as "grading" and "watercourse protection zone" are broad so that references to these items within the body of the ordinances are all inclusive and can be modified readily.

Where ordinances call for development of adequate and effective erosion and sedimentation control measures, persons shall observe the standards provided within the ordinances and for additional technical guidance refer to the Soil Conservation Service's Technical Standards and Technical Guide, which were designed to provide a basis for evaluating the adequacy of technical assistance, a source of technical information, and a useful training tool in both planning and application.

Grading/Erosion/Sedimentation Control

The purpose of the Grading/Erosion/Sedimentation Control Ordinance is to establish comprehensive standards and procedures for the conduct of grading operations that will mitigate the impact of such operations on surface water quality. Existing grading regulations are primarily concerned with structural stability and do not address erosion and sedimentation control. The key feature of the ordinance is a requirement that all applicants for a grading permit must submit a Grading and Erosion/Sediment Control Plan concurrently. The ordinance specifies the plan contents which include descriptions of existing and modified physical characteristics of the site, proposed mitigative measures, an implementation schedule, and maintenance provisions. The ordinance also details standards which will govern the issuance of all grading permits and approval of all Grading and Erosion/Sediment Control Plans. The standards are comprehensive but are generally concerned with cut and fill operations, vegetation preservation, storm runoff control, and watercourse protection. Violations of the provisions within this ordinance, as determined by the Director is punishable by civil fines and stop work orders.

Maintenance or Erosion/Sediment Control Devices

The intent of this ordinance is to insure that once erosion and sedimentation control measures are implemented, they are properly maintained. If the Director determines that maintenance is inadequate, the property owner is notified and informed of the necessary corrective measures and a time schedule in which to make the appropriate remedies. Upon failure to comply, the Director can make the necessary corrections and assess the cost to the property owner as a lien on his property.

Keeping Livestock

Provisions within the Livestock Ordinance seek to protect water quality from the keeping of livestock. Standards detailed in the ordinance provide for the establishment of buffer zones and the use of vegetative buffer strips, diversions, dissipators, sediment basins and other erosion and sedimentation control measures. Furthermore, the keeping of livestock including horses, cattle, goats, sheep, or hogs within defined areas is permissible only where property owners have first obtained a permit from the (Director). Application for such a permit must be accompanied by a detailed plot plan whose contents are described in the ordinance.

EROSION/SEDIMENTATION CONTROL MODEL ORDINANCE 1

#______ Purposes. The purpose of this ordinance is to control and prevent the adverse effects of erosion and sedimentation in (______) which include, but are not limited to, loss of valuable topsoil; increased agricultural costs; increased road and drainage maintenance costs; destruction of crops, lawns, roads, and recreation areas; filling of ditches, drains, culverts, streams, lakes, and man-made impoundments; increased flood hazards; and transport of other pollutants. The control and prevention of such detrimental impacts; and in general and preservation and protection of the natural environment, and the public health, safety, and general welfare can be accomplished by: regulating the alteration of land and topography; regulating the removal of vegetation; specigying standards for drainage system construction; requiring erosion and sedimentation control; assuring the continued, efficient operation of the drainage system; and protecting streams and floodplains from substantial alteration of their natural functions.

#______ Construction. The provisions of this ordinance shall be liberally construed to accomplish its purpose and objectives.

#______ Severability. If any provision of this ordinance in the application thereof to any person or circumstances is held invalid, such invalidity shall not affect other provisions or applications of this ordinance which can be given effect without the invalid provisions or application and to this end the provisions of this division are severable.

#______ Nuisance Abatement. No provision of this ordinance is a limitation on any of the following:

> ____. On the right of any person to maintain an appropriate action for relief against a private nuisance or for any other private relief.
>
> ____. On the power of any city or county to declare, prohibit and abate nuisances.

# Effect on Other Laws. No provision of this ordinance is intended to repeal, abregate, annul, impair or interfere with any rules, regulations, ordinances or permits previously adopted, promulgated, or issued pursuant to law. However, wherever this ordinance imposes greater restrictions, the provisions of this ordinance shall govern.

Section Definitions

"Aggrieved person" means any person who, in person or through a representative, appeared or otherwise communicated with the (Director) and informed the (Director) of his concerns prior to the determination of the (Director).

"Agricultural Land" is the land used for the production of food and fiber, including but not limited to, general farming, livestock and poultry enterprises, grazing, nurseries, horticulture, viticulture, truck farming, forestry, sod production, berry production and wild crop harvesting and includes lands used for on-site structures necessary to carry out such activities.

"Agricultural Land Grading" is the initial act of shaping the surface of agricultural land, to a planned grade, to facilitate the most efficient and effective movement of irrigation water over the surface of the land. Also called land leveling, or land shaping. Does not include annual practices of grading, shaping or plaining used to prepare for, produce, and/or harvest crops.

"Agricultural Land Use Change" is a change in the use of agricultural land, from one agricultural use to another, which may increase the number and frequency of cultural operations, or which may result in the permanent removal of ground cover, and which may increase runoff and/or soil erosion. For example: The conversion of sloping land that has historically been used for grazing, hay or grain production, to other uses such as irrigated vineyards, berries or truck crops.

"Best Management Practices" means preventive control measures, either structural, vegetative, or some combination thereof, determined to be most effective in terms of minimizing cost and controlling water pollutants; and for the prevention and/or control of accelerated erosion and sediment damage, Best Management Practices may include, but are not limited to, guidelines on management.

"Erosion" means the process by which the surface of the land is worn away by the action of water, wind, gravity, or a combination thereof.

(a) "geologic erosion" means the wearing away of the earth's surface by water, ice, or other natural agents under natural conditions of climate, vegetation, etc., undisturbed by man.
(b) "normal erosion" means the gradual erosion of land used by man which does not greatly exceed geologic erosion, where all reasonable soil and water conservation practices have been applied.
(c) "accelerated" means erosion much more rapid than normal erosion or geologic erosion primarily as a result of the activities of man.

"Excavating" is any act by which soil materials are cut into, dug, quarried, uncovered, removed, displaced or relocated.

"Farm or Ranch" is any parcel of land more than 20 acres in size, or, any parcel less than 20 acres from which the gross sale of agricultural products is $2,000, or more, annually.

"Filling" is the depositing by man or soil materials to raise the level of the ground.

"Grading"is altering the elevation of the land surface by stripping, filling, stockpiling of soil materials, as well as stripping or wholesale disruption, or any combination thereof, including clearing, filling, excavation or similar disturbance of vegetative cover.

"Grazing" is the act of allowing livestock to have access to any land for the purpose of obtaining browse or forage whether planted for that purpose or growing naturally.

"Intensive Agricultural Land Use" is the use of agricultural land for the production of crops that require many and frequent cultural operations which may result in the permanent removal of ground cover. This would include but is not limited to such crops as vineyards and vegetables.

"Land Use Change" is the change of land use from one purpose to another which may result in soil erosion. Including but not limited to removal of ground cover, grading, excavating, and filling of land.

"Parcel" means all contiguous lands under ownership or control of a person.

"Person" means any individual, organization, partnership, or other business association or corporation, including any utility, governmental entity or agency thereof to the extent permissable by law.

"Sediment" means the solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice, and has come to rest on the earth's surface.

"Sedimentation" is the process or action of depositing sediment and can cause the degradation of water quality by the presence of suspended solid particles, derived from soils by erosion or discharged into surface waters from other sources; or the deposition of water-borne sediments in stream channels, lakes, reservoirs, or on flood plains.

"Structural Measures" are works of improvement for land stabilization to prevent erosion, sediment or flood damage which includes, but are not limited to, gully control structures, grass waterways, riprap, sediment basins, flood retention dams, diversions, lining channels with rock, concrete or other materials.

"Unintensive Agricultural Land Use" is the use of agricultural land for the production of crops that require few and infrequent cultural operations which may result in the temporary removal of ground cover. This would include but is not limited to such crops as hay, pasture and grain.

"Watercourse Protection Zone" means any intermittent or perennial stream, river, drainage course, drainage channel or swale and includes its channel and banks, and a backshore zone consisting of any contiguous lands along the top edge of the channel or bank, or the high water mark where there is no defined channel or bank, of greater than ___% slope up to a maximum distance of ___ft. from the top edge of the channel or bank or the high water mark where there is no defined channel or bank, but in no event shall the backshore zone be less than ___ft. Where any such watercourse protection zones have been mapped and adopted by the (Board), the map shall define the boundary of such watercourse protection zone.

Erosion-Sedimentation

#_____ Permits. Any person wishing to perform or undertake any grading shall obtain a grading permit from the Director or the (Board) on appeal except as provided herin.

#_____ Exemptions. Notwithstanding any provision of this article to the contrary, no grading permit shall be required pursuant to this article for the following:

(a) Grading for agricultural purposes except where:

#_____ i. Agricultural land grading activity affecting over _____ acres, or _____ acres if the (average) slope exceeds _____%, or if any portion of the slope exceeds _____%, or if the activity involves the movement of more than _____ cu. yards of material or takes place within _____ ft. of a watercourse protection zone.

#_____ ii. Agricultural land use changes that will cause or intensify cultural activities such as plowing, discing, or other similar disturbance of the natural vegetation if the area affected is greater than _____ acres, or _____ acres if the (average) slope exceeds _____%, or takes place within _____ ft. of a watercourse protection zone

(b) Notwithstanding the provisions of a(i) and a(ii) above, activities dealth with in such provisions done under a land conservation plan approved by the Director or when it is determined by the Director that such use will not cause excess erosion or sedimentation.

(c) Grading involving the disturbance of an area less than _____ sq.ft., or less than _____ cu.yds. in volume unless located within _____ ft. of any watercourse protection zone.

(d) Emergency work necessary to preserve life or property; provided, however, that when emergency work is performed under this section, the person performing it shall report the pertinent facts relating to the work to the Director within _____days after commencement of the work and shall thereafter obtain a permit pursuant to Section _____ and perform such work as may be determined by the Director to be reasonably necessary to correct any erosion or condition with a potential to cause erosion that was caused by the emergency work.

#______Procedures. The (Board) shall adopt procedures for the submission, review, and appeal of grading permit application including the Erosion and Sedimentation Control Plans. Such procedures shall include but are not limited to:

(a) Application and appeal forms

(b) Application and appeal fee schedules providing for reasonable fees for the reimbursement of expenses for the processing of any application of appeal under this ordinance.

(c) Guidelines for the interpretation of the standards contained herin which may be amended from time to time as additional experience and information warrants.

(d) Notification of the public.

(e) Performance bonds to insure the completion of erosion and sediment controls.

#______Exemptions. Upon application, the Director may exempt such grading from the provisions of this ordinance if he determines, and supports by written findings, that such grading is minor in nature, possesses no potential for causing or aggravating erosion, and is consistent with the intent of this ordinance.

#______Amendments to Permits. Any person wishing to amend a permit shall apply for such amendment in the same manner as provided for a permit in Section _____.

#______Minor Amendments. If the Director determines that an amendment is monor in nature, would not result in any hazard to life or limb, hazard to property, adverse effects on the safety, use or stability of a public way or any drainage channel or watercourse, any erosion of sedimentation, or adverse impact on the natural environment, and supports such determination with written findings, such amendments may be authorized by the Director.

#_____ Appeals. Any aggrieved person may appeal the decision of the Director to the (Board) except as provided herin. The appeal must be filed within _____ days on an appeal form established by the (Board) or the decision of the Director shall become final.

#_____ Non-Appealable Decisions. The decision of the (Director) shall be final with respect to the following:

(a) Determinations as to exemptions because of the minor nature of the work.

(b) Determinations as to the material or non-material nature of amendments to permits.

(c) Determinations as to extensions of time.

(d) Determinations as to emergency permits.

#_____ DeNovo Appeals. The (Board) shall hear all valid appeals in de novo public hearing and its determination shall be final.

#_____ Performance Bonds. No grading permit shall become effective unless and until performance bonds or similar security in favor of the (jurisdiction) are provided sufficient in amount to cover the cost of constructing all erosion control devices and establishing such vegetation as required by the grading permit. The sufficiency of such security shall be determined by the Director and shall be released upon satisfaction of the terms and provisions of the permit.

#_____ Certification of Completion. Upon commencement of any grading work under a grading permit, no additional grading, building, accupancy, or special use permits or similar entitlements for use shall become effective until the Director certifies that the erosion and sediment control provisions of the grading permit have been satisfactorily completed. The terms of the grading permit may specify a schedule of activities permitting partial satisfaction of permit conditions to allow partial certificates of completion to be filed where, in the discretion of the Director such incremental procedures will not cause or increase the risk of excess erosion or sedimentation.

#_____ Compliance with Standards. No permit shall be issued unless the Grading and Erosion/Sediment Control Plan complies with the standards contained herein and the intent of this ordinance. The Director or the (Board) on appeal shall impose such conditions on the permit as are necessary to insure compliance with the intent of this ordinance.

#______ Work Conforming to Permit. All grading shall be undertaken in conformity with the terms and conditions of the approved Grading and Erosion/Sediment Control Plan and grading permit.

#______ Violation. Any person who violates any provision of this ordinance shall be subject to a civil fine of not less than $____ nor more than $_____ for each day in which such violation occurs.

#______ Exemplary Damages. Where a person has intentionally and willfully violated any provision of this ordinance, the (Board) may maintain an action, in addition to that provided in Section _____, for exemplary damages and may recover an award, the size of which is left to the discretion of the court. In exercising its discretion, the court shall consider the amount of liability to deter further violations.

#______ Additional Remedies. The remedies provided by this ordinance shall be in addition to any other remedies available at law including injuctive relief to restrain any violation of the provisions contained herin.

#______ Inspection. The Director shall have the authority, when in the performance of his duty, to enter upon any premises where grading authorized by a grading permit is being undertaken, with such tools and equipment as may be necessary or convenient, solely for the purpose of inspecting such work to determine compliance with terms and conditions of such permits.

#______ Stop Work Orders. When the Director determines that a violation of this ordinance is taking place, he shall issue a stop work order to the person responsible for such violation. Such order shall have the effect of suspending any permit issued pursuant to this ordinance until such violation has been corrected to the satisfaction of the Director or the (Board) on appeal.

#______ Submission of Plans. The filing of an application for a grading permit shall be accompanied by a Grading and Erosion/Sediment Control Plan. Such plans shall be prepared and certified as being in conformance with these provisions by a (______________________) qualified in erosion control matters and acceptable to the (Director).

#______ Plan Contents. The Grading and Erosion/Sediment Control Plan shall include the following:

(a) A map showing the topography of the parcel at _____ft. contour intervals in areas of cross-slope of less than 5%, at _____ft. contour intervals in areas of 6% through 10% cross-slope, and at _____ft. contour intervals in areas exceeding 10% cross slope. The map shall show the condition of the land in its existing condition, and the surrounding areas shall be indicated. A second map, or an overlay to the first, shall show the condition of the land in its proposed condition and the surrounding areas at a level of detail identical to the first map.

(b) Soils characteristics including the nature, distribution, erosion hazard, and strength of existing soils, based on USDA, Soil Conservation Service soil maps, and soil descriptions and classifications.

(c) Geologic characteristics of the site including any evidence of landslides, slumps, or faults.

(d) Hydrologic characteristics of the site and the hydrologic subsystem on which the site is located including the location, capacities and condition of all watercourses, based on USDA, Soil Conservation Service methods.

(e) Description of the vegetation on the site both as existing and proposed.

(f) Location of any existing buildings or structures on the property where the work is to be performed, the location of any existing buildings or structures on land of adjacent owners which are within 100 feet of the property or which may be affected by the proposed grading operations, and proposed or approximate locations of structures relative to adjoining topography.

(g) The direction of drainage flow and approximate grade of all streets.

(h) Limiting dimensions, elevations, or finish contours to be achieved by the grading, including all cut and fill slopes, proposed drainage channels, and related construction.

(i) Detailed plans and locations of all structural and nonstructural erosion and sedimentation control devices, including temporary and permanent surface and subsurface drainage devices, walls, dams, sediment basins, storage reservoirs, and other protective devices to be constructed with, or as a part of, the proposed work, together with a map showing drainage area, a complete drainage network, including outfall lines and natural drainageways which may be affected by the proposed development, and estimated runoff of the area served by the drains.

(j) A description of methods to be employed in disposing of soil and other material that is removed from the grading site, including the location of the disposal site.

(k) A schedule showing when each stage of the project will be completed, including the total area of soil surface which is to be disturbed during each stage, and estimated starting and completion dates, the schedule shall be drawn up to limit to the shortest possible period the time that soil is exposed and unprotected.

(l) Maintenance provisions for insuring the continued usefulness of all erosion control measures.

(m) Such other information as the Director determines is necessary to determine the effect of the grading and compliance with the intent of this ordinance.

#______ Standards. The following standards shall govern the issuance of all grading permits and approval of all Grading and Erosion/Sediment Control Plans pursuant to this ordinance.

(a) Plans for development and construction shall minimize cut and fill operations.

(b) During development and/or construction, adequate protective measures, temporary and permanent, shall be provided to minimize damage from surface water to the cut face of excavations or the sloping surfaces of fills.

(c) Fills shall not encroach upon natural watercourses, their floodplains, or constructed channels in a manner so as to adversely affect other properties.

(d) Land shall be developed in increments of workable size which can be completed during a single construction season. Erosion and sediment control measures shall be coordinated with the sequence of grading, development, and construction operations. Control measures such as seeding, fertilizing, mulching, berms, interceptor ditches, terraces, and sediment traps shall be put into effect prior to the commencement of each increment of the development/construction process.

(e) Sediment basins (debris basins, desilting basins, or silt traps) shall be installed in conjunction with the initial grading operations and in no event later than _____________, and maintained through the development process to remove sediment from runoff waters draining from land undergoing development.

(f) Alteration of land in existing developed areas shall be conducted in such a manner than changes in patterns of natural drainage shall not adversely affect other landowners, any natural or public drainageway; and no restrictions or barriers, including fences, may be placed in these drainageways or floodplains except as provided herein.

(g) No construction materials or construction by-products shall be discarded in any drainageway or stream.

(h) Fill areas shall be prepared by removing organic material, such as vegetation and rubbish, and other material detrimental to proper compaction or otherwise not conducive to stability; no rock or similar irreducible material with a maximum density greater than _____ inches shall be used as fill material in fills that are intended to provide structural strength.

(i) All retaining walls or facings with a total vertical projection in excess of _____feet and associated with cut or fill surfaces shall be designed as structural members keyed into stable foundations and capable of sustaining the design loads.

(j) Fills shall be compacted to at least 95% of maximum density.

(k) Natural or constructed slopes in excess of _____% shall not be subjected to development.

(l) Cut slopes shall be no steeper than _____ horizontal to _____ vertical; subsurface drainage shall be provided as necessary for stability.

(m) Fill slopes shall be no steeper than _____ horizontal to _____ vertical; fill slopes shall not be located on natural slopes _____ or steeper, or where fill slope toes out within _____ feet horizontally of the top of an existing or planned cut slope.

(n) Tops and toes of cut and fill slopes shall be set back from property boundaries a distance of _____ feet plus _____ of the height of the cut or fill, but need not exceed a horizontal distance of _____ feet; tops and toes of cut and fill slopes shall be set back from structures a distance of _____ feet plus _____ the height of the cut or fill, but not exceeding _____ feet.

(o) Borrowing for fill shall be prohibited unless the material is obtained from a cut permitted under an approved grading plan obtained for some purpose other than to produce fill material, or imported from outside the jurisdiction.

(p) All slopes which are stabilized by mechanical or chemical restraints shall be adapted to conform to the surrounding terrain and shall maintain a natural appearance.

(q) Existing vegetation of the deep-rooted perennial variety shall be preserved to the greatest extent possible in the location of roads, structures, and other land-soil disturbing activities. Road alignment should follow natural terrain and no unnecessary cuts or fills shall be allowed in order to create additional lots or building sites.

(r) Vegetation shall be removed only when absolutely necessary, e.g., for buildings, filled areas, roads.

(s) Every effort shall be made to conserve topsoil which is removed during construction for later use on areas requiring vegetation or landscaping, e.g., cut and fill slopes.

(t) Temporary vegetation sufficient to stabilize the soil while permanent vegetative cover is maturing shall be established on all disturbed areas as each stage of grading is completed. Areas not contained within lot boundaries shall be protected with adapted, fire-resistent species of perennial vegetal cover after all construction is completed.

(u) New plantings shall be protected by measures such as seeding, fertilizing, and mulching.

(v) All disturbed soil surfaces shall be stabilized or covered within a total of _____ days and in any event should be completed before the rainy season running from __________ to __________. If the planned impervious surfaces (e.g. roads, driveways, etc.) cannot be established prior to October 15, a temporary treatment adequate to prevent erosion shall be installed on those surfaces.

(w) Construction shall be scheduled to minimize soil disturbance between (date) and (date) . (the normal rainy season of the area)

(x) The applicant shall be fully responsible for any destruction of existing vegetation proposed for retention. He shall carry the responsibility both for his own employees and for all subcontractors from the first day of construction until the notice of completion is filed. The applicant shall be responsible for replacing such destroyed vegetation.

(y) The use of qualified personnel experienced and knowledgeable in the practice of revegetation shall be required.

(z) No paving with concrete, asphalt, or other impervious material within the tree crown zone of trees to be preserved shall be allowed.

(aa) Soil and other materials shall not be temporarily or permanently stored in locations which would cause suffocation of root systems of trees to be preserved or would cause acceleration of the erosion process.

(bb) The permanent vegetation shall be installed on the construction site as soon as utilities are in place and final grades are achieved.

(cc) The paving of streets, parking lots, and other areas shall be completed in conjunction with final grading for these areas. Final grading and removal of vegetation shall not occur more than 30 days prior to scheduled paving.

(dd) Seeding, fertilizing and mulching shall be carried out on all bare, graded, and/or disturbed areas including areas to be landscaped with trees, shrubs or other slow growing permanent vegetation within a total of 30 days and in any event no later than the start of the rainy season.

(ee) A drainage and runoff control system shall be completed and made operational at the earliest possible time during the initial grading and/or construction activities, and in any event prior to the start of the rainy season running from __________ to __________.

(ff) The Drainage and runoff control system and its component facilities, shall be non-erosive in design, and shall conduct runoff to stable outlets (natural or constructed).

(gg) The drainage and runoff control system and its component facilities will be designed to fit the hydrology of the area under fully developed conditions, and to handle runoff from a storm of 100 year frequency, 24 hour duration.

(hh) A combination of storage and controlled release of storm water runoff shall be required for all development and construction.

(ii) The release rate of storm water from all developments shall not exceed the storm water runoff from the area in its natural undeveloped state for all intensities and durations of rainfall. The carrying capacity of the channels immediately downstream must be considered in determining the amount of the release. The release rate shall not be greater than that calculated from a storm of _____ year frequency with a runoff rate coefficient of _____, _____ and _____ for land with an average slope of up to _____%, _____ to _____%, and over _____% respectively.

(jj) The drainage system being developed shall have adequate capacity to bypass through the development the flow from all upstream areas for a storm of _____ year design frequency for the land upstream under projected development. The bypass flow rate shall be not less than the _____ year flow rate of record or computed using a runoff coefficient of not less than _____.

(kk) The retention storage to be provided shall be calculated on the basis of the 100-year frequency rainfall for the affected area. The retention volume required shall be that necessary to handle the runoff of a 100-year rainfall, for any and all durations, from the proposed development less that volume discharged during the same duration at the approved release rate as specified above.

All free-flowing storm drainage systems shall be designed to accommodate the runoff generated by a 100-year design storm without creating static head at the entrance and to accommodate the runoff generated by a 100-year design storm utilizing the available head at the entrance.

(ll) When the (Board) determines that development and construction projects are too small, or engineering, aesthetic, and economic factors make combined retention or other drainage facilities more practical for construction by the (__________), the (_____________) shall require a fee or equivalent dedication of land which the county shall use to construct these facilities. The (_____________) may permit several developers to construct joint facilities. The Director shall approve or disapprove the waiver of on-site drainage or retention facilities on the basis of the engineering feasibility of a combined facility. The Director shall not accept a fee or dedication of land less than the proportionate share for that piece of property in its developed state and the present costs of construction such drainage or retention facilities.

(mm) Retention facilities and drainage structures shall, where possible use natural topography and existing vegetation for protection and landscaping. If the existing vegetation can not be used, or is not adequate, climatically adapted species of trees, shrubs and permanent ground cover will be used, provided however, that they are not the type that will reduce the strength of any structure or impair the operation and maintenance of the facilities. (e.g. roots may cause seepage and failure of earthen dams; vegetation can reduce the flow capacity of channels, etc.). All on-site facilities shall be properly maintained by the owner such that they do not become nuisances. Nuisance conditions shall include: improper storage resulting in uncontrolled runoff and overflow; stagnant water with concomitant algae growth, insect breeding, and odors; discarded debris; and safety hazards created by the facility's operation. Provisions shall be made for the maintenance of all common and public retention ponds and facilities.

All runoff control structures located on private property whether dedicated to the (____________)or not shall be accessible at reasonable times for inspection. Where runoff control structures have been accepted by the (______________) for maintenance, access easements shall be provided.

(nn) No grading shall take place within any watercourse protection zone except that which is absolutely necessary, and then only with such mitigation measures as are necessary to insure that no excess erosion or sedimentation is cause, and only for the following purposes.

i. Drainage and erosion control devices.
ii. Utilities
iii. Roads, streets and bridges
iv. Recreation facilities

(oo) During construction, all disturbed areas (cuts, fills, graded and/or bare areas) shall be sprinkled with water to prevent dust and/or wind erosion.

#________Waiver. Upon a conclusive demonstration by the applicant that any of the standards contained herein are not necessary in the proposed development and that the omission of such requirements would not result in hazard to life or limb, hazard to property, adverse effects on the safety, use or stability of a public way or any drainage channel or watercourse, any erosion or sedimentation, or adverse impact on the natural environment, the Director or the (Board) on appeal may waive those particular requirements.

EROSION/SEDIMENT CONTROL DEVICE MAINTENANCE MODEL ORDINANCE 2

#____ Maintenance by Owners. Owners of property that has been graded under a grading permit issued pursuant to __________ shall maintain all such erosion and sediment control devices and vegetation required by such permits.

#____ Inspection. Upon a determination by the Director that a condition exists in violation of Section ___, the person designated by the Director pursuant to Section ____ shall have the authority, when in the performance of his duty and upon first presenting his credentials and identifying himself to the person apparently in control of the premises, if available, to enter upon any such premises between the hours of 8:00 am and 6:00 pm with such tools and equipment as may be necessary or convenient solely for the purpose of inspection and investigation to determine the cause or condition violating the provisions of __________ and determination of the best practicable method for eliminating such violations.

#____ Notification of Violation. The Director shall notify any person he has reason to believe has not maintained such erosion and sediment control devises and vegetation in the manner provided in _____________ in writing and such notification shall specify the defects in such maintenance, the methods of correcting such defects, and the time within which such defects must be corrected.

#____ Abatement. If such defects described in Section ____ are not corrected within such time period, the Director may (abate such conditions as provided in _______________) cause such corrective measures to be completed after ____days of notifying the owner of such determination, and the cost of such measures shall constitute a lien on the property as provided in ____________.

#____ Finality of Decisions. The decision of the (Director) shall be final unless an appeal is filed with the (Board) within _____ days as provided in Section ______.

Livestock Permit. No person may keep livestock including horses, cattle, goats, sheep or hogs within (urban or non farm/ non ranch areas) without having first obtained a livestock permit from the (Director) or the (Board) upon appeal.

# Permit Application. The Board shall adopt procedures for the submission, review, and appeal of livestock permit applications. Such procedures shall include but are not limited to:

(a) Application and appeal forms

(b) Application and appeal fee schedules providing for reasonable fees for the reimbursement of expenses for the processing of any application or appeal under this article.

(c) Guidelines for the interpretation of the standards contained herein which may be amended from time to time as additional experience and information warrants.

(d) Notification of the public.

(e) Performance bonds to insure completion of erosion and sediment controls.

# Exemption. Upon application, the (Director) may exempt such keeping of livestock from the provisions of this article if he determines, and supports by written findings, that such use is minor in nature, possesses no potential for causing or aggravating erosion, adversely affecting water quality of any watercourse, and is consistent with the intent of this article.

# Permit Submittals. The filing of an application for a livestock permit shall be accompanied by a detailed plot plan, including the following:

(a) The location of all dwellings and other structures, fences, and corrals.

(b) A map showing the topography of the parcel at _____ ft. contour intervals in areas of cross-slope of less than ____% and at _-_ ft. contour intervals in areas exceeding ____% cross-slope.

(c) All wells, streams, swales, and watercourses on or within ____ ft. of the property

(d) All erosion control devices including buffers, diversions, and sediment basins and shall include methods of establishing and maintaining such devices.

(e) Such other information as the (Director) determines is necessary to determine the effect of the keeping of livestock and compliance with the intent of this article.

# ______ **Standards.** The following standards shall apply to the keeping of livestock:

(a) No livestock shall be permitted within the buffer zone to be established along all watercourses and drainage ways. The buffer zone shall be established by the (Director) on the basis of the vegetation, slope and composition of the soils surrounding the drainageway but in no event shall such buffer be less than _____ nor more than ________ft. in depth.

(b) "Vegetated buffer strips shall be established on all downhill sides of areas where livestock is kept. The width of the buffer strip shall be determined by the following: Width in feet ______x average % slope. The buffer strips shall be climatically adapted grasses with fibrous root systems or material with similar properties. The buffer strip will be protected from grazing by a fence on the uphill side (between the buffer strip and the livestock) if along a property line the width of the buffer strip and the setback of the fence will be measured uphill from the property line."

(c) Where necesary to ensure that water quality is not affected by the keeping of livestock, such devices as diversions, dissipators and sediment basins will be required to control runoff.

CLUSTER DEVELOPMENT MODEL ORDINANCE

Approach to Model Ordinance Formulation

The cluster development model ordinance is intended to encourage more sensitive site planning and a resultant clustering of development within a larger site. This should ensure that wastewater objectives and other natural resource and environmental quality objectives are fostered in areas of special sensitivity or significance.

The market for cluster development now appears to exist. Advances in site design and marketing have made such units easily saleable. Additionally, clustering provides more usable open area and carefully designed structures preserving views and ensuring recreational assets and amenity.

The major innovations in this ordinance are the comprehensiveness of standards, the use of a special cluster development combining zone and a systematic procedural process.

The regulations are proposed for application in a cluster development zoning district. These districts would be mapped in identified areas. This would require modification of existing zoning ordinances to include a cluster development combining district, which could use such letters as-CD after the normal zoning district name to indicate the combination.

The procedure would use a cluster development permit, issued upon a showing of adherence to all cluster development standards and permit criteria. The permit would be waived where the total development were less than a specified size considered negligible in terms of total environmental impact. The permit can be the use permit or conditional use permit operative in most jurisdictions.

Summary of Model Ordinance

Among the development standards and criteria for the permit are: compatibility with adjacent land uses; relationship to natural features; supersedence of normal density regulations; maximum residential coverage; a minor density bonus (not more than 5%) where the proposed development is kept at least 80% free from land alteration and is in permanent common open space through appropriate forms of perpetual restriction or public dedication; a majority of the open space is useable for recreational purposes with less than a 10% slope; mixture of housing types provided; creative site planning is evident; landscaping is effective; and a variety of transportation modes is fostered by site design reducing automobile usage.

Because of the more compact urban form, it may be feasible in some circumstances to override underlying height restrictions. A specific regulation is included which allows this up to a specified percentage over standard height. Moreover, normal restrictions relating to spacing between buildings can be waived if the site planning is such that it insures privacy, light and air, and proximity of compatible uses. Lot widths also may be reduced. Usable open space around buildings specifically is required because of a temptation in compact development to build on steep and irregular sites.

A relatively generalized standard relating to building appearance requires that materials and colors blend in with, rather than provide stark contrast to, surroundings. Although such judgements can be subjective, they are legally defensible and highly important to the visual blending of a particular development to its setting.

Standards for streets are provided which suggest that all streets should reflect a rural rather than urban character, that they should be designed for minimum land coverage and disturbance of soil, that certain variations from standards are permitted to prevent dedication of unnecessarily large parcels of land for street purposes, that one-way streets be allowed where terrain and public safety permit, that streets generally follow contours, that maximum grades be respected and that streets not traverse slopes over 25% grade. Other standards are included which will insure that severe land disturbance and disharmony with the natural landscape is avoided.

A new cluster development procedure is included in the model ordinance to be included in the procedures section of local ordinances. It encompasses the notion of a concept plan at the time of application, providing a general narrative and development direction to which the local public agency can react. This includes a generalized site plan showing at least the approximate location of buildings, rights-of-way, parking spaces, parking areas, natural open spaces,etc. An initial environmental study would be offered in conjunction with this concept plan. The plan is then reviewed and a conference held on it with the applicant.

Significant modifications could still occur in the site plan based upon application of standards. Thus, after the concept plan, conferences and reactions, a preliminary development plan is required. Here, the applicant provides more specific statements of intent and documentation of design and environmental character supported by specific graphic submissions, including contours, natural features, lot lines, building form and location, dedications, circulation system, vehicular and pedestrian utility systems, adjacent land areas, and perimeter treatment. Upon submission of the preliminary plan it is reviewed, again using a conference format, and a draft environmental impact is prepared, if necessary. The planning commission hears the preliminary development plan and makes a decision on it. Minor changes can be made in this, as authorized by the commission, without additional public hearings. After this, a final development plan is prepared incorporating major revisions required by the planning commission,which is then submitted to the director who has the authority to grant the cluster development permit without further action.

Legal Issues

Overriding authority exists in the state planning and zoning law to enact planning and development control procedures. Although planned unit development procedures are not specifically authorized in that law, they have been upheld under general police power authority. There is little reason to assume that a site-specific ordinance would have less standing, and indeed may have more. However, the corollary of this is that the locations in which the cluster procedure would be mandatory must be thoroughly justified from a technical standpoint and the need for the procedure from the standpoints of erosion control, aquifer recharge, and other "208" findings must be noted. Otherwise, difficult equal protection issues may be raised.

A continuing legal issue is the extent to which an underlying cluster development plan can remain applicable over an extended period. Some provision in the ordinance may have to be made to cover this matter.

Pre-existing uses in the cluster development combining district may be troublesome. Such uses may have a significant effect on the larger area. Accordingly, non-conforming use provisions may have to be modified with some amortization provision included.

Administrative and Procedural Implications

The existing model ordinance or some variant, should be included in the zoning ordinances of the local jurisdictions. It would be inserted in two separate sections -- combining zones, which if they do not already exist in the ordinance should be located after the basic zones, and procedures, in which the cluster permit procedure would be an identifiable unit.

The requirements for additional drafting of ordinances are generally limited. However, the locally-devised "environmental impact report" guidelines must be carefully related to this procedure, and may require modifications. Additionally, subdivision control procedures should be reviewed in terms of timing of tentative map submittals to correspond to this procedure, or vice-versa.

The implications for administrative burdens are significant, even though the zone will be mapped in limited areas. A cluster development permit application constitutes a significant commitment by the applicant and deserves a correspondingly intensive and sensitive review by local government. The staff required to review the proposals need not be any more sophisticated in training or background than normal urban or environmental planning requires.

Many jurisdictions in the area already have planned unit development procedures similar in nature but less detailed. However, these procedures are permissive and not required in specific areas. They simply provide an opportunity for relaxation of requirements for developments of a certain size. It is clear that such procedures are not sufficient for "208" purposes. For instance, Monterey County has an "ST" District which is permissive and has few adjunct standards. The cluster development ordinance could be enacted, and placed following the other "combining" type zones after Section 28.12, with the procedure included as Section 33.

Uncontrolled runoff's threat pointed out in county tour

By DON DUGDALE
Californian Staff Writer

Las Lomas is an area of North Monterey County with a surprising number of green lawns for drought-plagued Northern California.

But most of the green lawns are not the result of regular watering by homeowners, but of failed septic tank systems whose natural fertilizer is seeping to the surface.

It's good for the lawns, but not for the health of the residents.

Las Lomas was one of five problem areas visited by area governmental leaders, civic representatives and newspeople Saturday on a bus tour sponsored by the Association of Monterey Bay Area Governments (AMBAG).

Other problem areas viewed first-hand by the tour's 20 or so persons were Seaside's Laguna Grande, threatened by surrounding development; hillside erosion caused by development throughout the Salinas-Monterey area; nitrate-contaminated wells in Boronda; and salt water intrusion near Castroville.

There are some of the problems AMBAG is trying to identify, assess and find solutions for in its $829,500 two-year 208 water quality study in Monterey and Santa Cruz counties.

The study is now in its final few months and is scheduled for completion next June.

Among the revelations made by AMBAG water and soil consultants on the tour were:

—That Seaside's Laguna Grande is a dying lake because of soil erosion and nutrient deposits from urban development and construction as far away as Hidden Hills.

—That thousands of tons of soil are eroded from the county's hillsides because of improper protection after cutting away soil for roads and buildings.

—That nitrates from fertilizers and other sources could threaten the underground water supply throughout the Salinas Valley.

—That keeping even one horse on a small rural lot can cause serious water runoff problems.

Cut Off

Laguna Grande used to be a coastal lagoon, but is now cut off from the ocean by man's development and cut in two by Del Monte Boulevard, forming Roberts Lake on the west side.

The lake's 17 square miles of watershed includes six square miles of urbanized area. Nutrients (food material) and sediments are coming into the lake and causing more extensive vegetation, according to Oscar Balaguer, assistant regional planner for AMBAG.

The Source

The 208 study is trying to find out exactly where the nutrients and sediments are coming from.

The result of man's influence is that a lake which might normally take 1,000 years to evolve into dry land now has that process shortened to perhaps 50 years. Balaguer estimates the lake could be 25 years from extinction.

The lake is also being proposed for development into a recreational area by the cities of Monterey and Seaside and the Monterey Peninsula Regional Park district, Balaguer notes.

"There is a question of what kind of natural ecosystem can be maintained here," he says. "Should it be maintained for wildlife or used for intensive recreation?"

Intensive commercial uses are also encroaching on the land surrounding the lake.

Consultant Jim Barrett, a resource conservationist from the U.S. Soil Conservation Service, points out that cutbanks for roads and buildings in the county "are producing tremendous amounts of sediment in the area and actually endangering the stability of new homes.

Slide Hazard

"You've got to cut them back to a stable slope and then protect them or they'll erode on you or slide on you," he says.

As one example, he pointed to the road leading to the Hidden Hills housing area from State Route 68 — a road which caused erosion so bad in the early 1970s that the road itself collapsed.

Barrett estimates 35 tons of sediment a year are swept up on every mile of Seaside pavement, due in part to the runoff from Canyon Del Rey and the are above it.

One of the most difficult p blems to deal with is nitrate c tamination of Salinas Valley w water, Balaguer said. The hig nitrate content poses t possibility of oxygen deprivati in babies and has forced the cou ty health departments to close wells in the Valley since April.

Balaguer believes the proble is caused partly by nitrogen fe tilizers which have seeped dov into the groundwater aquif after years of irrigation.

Other Sources

"There are no precedent f control of irrigation water on th scale," Balaguer said. Oth sources which may be co tributing to the nitrate co tamination include septic tank feed lots, and municipal percol tion ponds for sewage.

Over-irrigating may be or cause of the nitrate seepag Balaguer said. "Maybe he (th farmer) turns it on at eight in th morning and turns it off at five i the afternoon. That's commo practice. Nitrate leaches into th aquifer. It's easier for him t over-irrigate than to take th trouble to irrigate properly."

But Barrett notes that the 20 study is trying to determine th precise source of the nitrate. "W don't really know who to blame," he says.

Barrett also pointed out tha horses kept on small lots in Nort County can cause a serious col lective runoff problem when th horses denude the hillsides o vegetation and rain carries th soil and the animal wastes ont the roads.

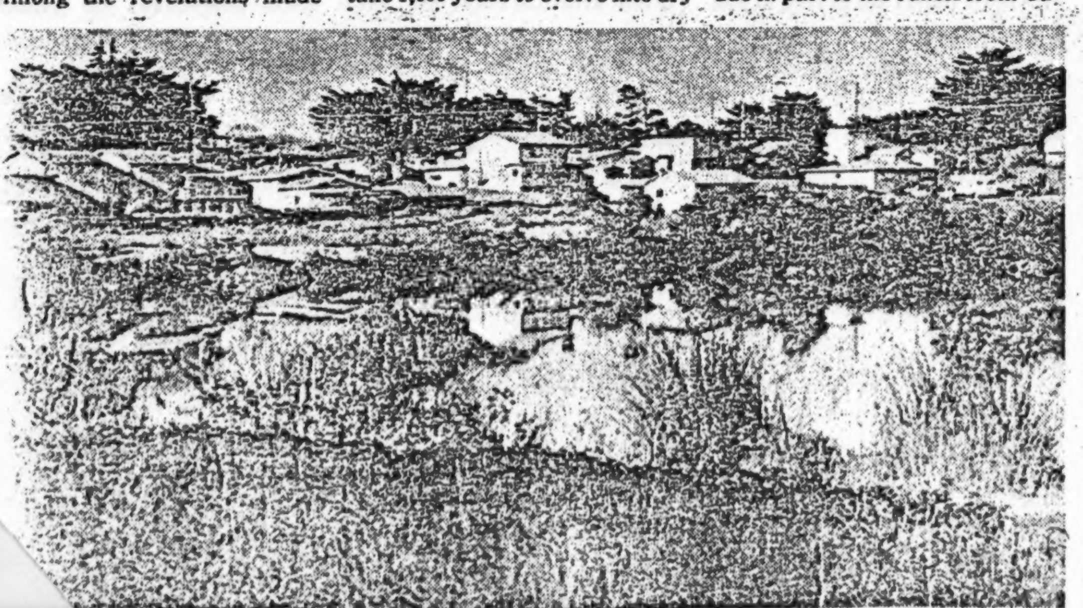
Five acres are required t maintain one horse on a hillsid area, Barrett says, and the fenc should be placed away from th property line so that the runof has a place to be contained.

"California as a whole has bee overgrazed in rangeland for th last 30 to 40 years," he notes.

And planting iceplant or hillsides is not a panacea to erosion control, he says. "There's a lot of erosion that takes plac under iceplant. It's not the bes ground cover for erosion control."

Las Lomas's serious septi tank failure problem has bee known for several years, and th area's residents have vote higher taxes for themselves t conduct an ongoing feasibility study of a future sewer system.

The community of 400 home



CLUSTER DEVELOPMENT MODEL ORDINANCE

GENERAL REGULATIONS

#____ TITLE AND PURPOSE. The provisions of Section ____ through Section ____, inclusive, shall be known as the Cluster Development Combining Zone Regulations. The purposes of this ordinance are to create a cluster development district and to establish procedures for designation of such districts. This ordinance makes provisions for areas unique in location and character and with highly vulnerable natural features and processes to be planned and developed on a unified basis. The creation of such combining districts is to promote flexibility in the design, location, and development of residential and nonresidential land uses; to promote more economical and efficient use of land; and to preserve and protect the area's natural features, processes, and aesthetic quality.

#____ DEFINITIONS.

Cluster Development. For purposes of these regulations, a cluster development is:

(a) Land under unified control, to be planned and developed as a whole;

(b) In a single development operation or a definitely programmed series of development operations, including all lands and buildings;

(c) For principal and accessory structures and uses substantially related to the character and purposes of the district;

(d) To be developed according to comprehensive and detailed plans that include not only streets, utilities, lots and building sites, but also site plans and floor plans for all buildings as they are intended to be located, constructed used, and related to each other, and detailed plans for other uses and improvements on the land as related to the buildings; and

(e) With a program for provision, operation, and maintenance of such areas, facilities, and improvements for use by some or all of the occupants of, or visitors to, the district, and for the protection of natural features and processes and the avoidance of natural hazards.

#____ CONSTRUCTION. The provisions of this ordinance shall be liberally construed to accomplish its purposes and objectives.

#____ SEVERABILITY. If any provision of this ordinance in the application thereof to any person or circumstances is held invalid, such invalidity shall not affect other provisions or applications of this ordinance which can be given effect without the invalid provisions or application, and to this end the provisions of this ordinance are severable.

#____ EFFECTIVE DATE. This ordinance shall take effect and be in force on and after ______________.

#____ EFFECT ON OTHER LAWS. No provision of this ordinance is intended to repeal, abrogate, annul, impair, or interfere with any rules, regulations, ordinances or permits previously adopted, promulgated, or issued pursuant to law. However, wherever this ordinance imposes greater restrictions, the provisions of this ordinance shall govern.

#____ ADMINISTRATIVE STANDARDS. Whenever, in the course of administration and enforcement of this ordinance, it is necessary or desirable to make any administrative decision, then, unless other standards in this ordinance are applicable, the decision shall be made so that the result will not be contrary to the purpose of this ordinance or injurious to the surrounding areas.

#____ GENERAL PROHIBITORY CLAUSE. No structure shall be constructed, erected, placed or maintained, and no land use commenced or continued within the Cluster Development Zone except as specifically, or by necessary implication, authorized by this ordinance.

CLUSTER DEVELOPMENT REGULATIONS

#____ TITLE AND PURPOSE. The provisions of Section ____ through Section ____, inclusive, shall be known as the Cluster Development Regulations. The purpose of these provisions is to insure the following: the preservation of land areas within (jurisdiction) which possess unique natural characteristics and features of a hydrological, geographical, geological, topographical or historical nature; to permit a more creative and imaginative design for development of an area than is generally possible under conventional zoning regulations; and to permit more economical and efficient use of land while providing a harmonious variety of structures, a higher level of amenities, and/or preservation of natural and scenic qualities and open spaces.

#____ APPLICATION OF CLUSTER DEVELOPMENT REGULATIONS. These regulations shall be applied where appropriate to achieve the purpose set forth in Section ____. The Cluster Development Regulations that follow shall apply generally to the initiation and regulation of all planned development within cluster development zoning districts. Where there are conflicts between the special regulations herein and general zoning, subdivision, or other regulations or requirements, these regulations shall apply in cluster development districts unless the (Board) (Council) shall find, in the particular case, the provisions herein do not serve public purposes to a degree at least equivalent to such general zoning, subdivision, or other regulations or requirements. Where actions, designs, or solutions proposed by the applicant are not literally in accord with applicable cluster development or general regulations, but the (Board) (Council) makes a finding in the particular case that public purposes are satisfied to an equivalent or greater degree, the (Board) (Council) may make specific modification of the regulations in the particular case, as provided in #____________ of this ordinance.

Except as indicated above, notwithstanding procedures and requirements generally in effect, procedures and requirements set forth herein and in guides and standards officially adopted as part of regulations for particular classes of cluster development districts shall apply in cluster development districts, to any amendments creating such districts, and to issuance of all required permits therein.

#_____ CLUSTER DEVELOPMENTS SUBJECT TO DEVELOPMENT CRITERIA; PERMIT REQUIRED. Cluster development zoning districts shall hereafter be established by amendment to the official zoning map and related amendatory action where areas suitable in location and character for the uses and structures are to be planned and developed on a unified basis, according to the requirements and procedures set forth herein.

Every development located in a zoning district to which these regulations apply shall be developed in accordance with the Cluster Development Standards commencing at Section ____ and shall require a cluster development permit issued in accordance with the Cluster Development Procedure commencing at Section ____; provided, however, that the Planning Commission may waive the application of this section for any such development less than ___ acres in area upon a finding that such waiver is consistent with the General Plan and the purpose of these regulations.

#____ PERMITTED USES. Any use permitted in the underlying zone shall be permitted in a cluster development subject to the standards set forth in Section ____ of this ordinance. No use shall be permitted except in conformity with a specific and precise Final Development Plan for the cluster development, pursuant to the procedural and regulatory provisions set forth in this ordinance. Whenever there is a conflict between provisions of the underlying zone and the cluster development combining zone regulations, the latter shall apply.

#_____ USE TYPES EXISTING PRIOR TO APPROVAL OF PLANNED DEVELOPMENT. Uses or use types established within a zoning district prior to the application of the Cluster Development Regulations to the underlying district may be expanded, extended, altered, replaced, or reestablished only when such uses or use types do not significantly alter the character of the district or hinder or detract from its eventual use for cluster development purposes. All expansions, alterations, replacements, or reestablishment of uses or use types shall be subject to obtaining a use permit in accordance with the procedures specified in #____ of the Zoning Ordinance.

CLUSTER DEVELOPMENT STANDARDS

#____ TITLE AND PURPOSE. The provisions of Section ____ through Section _____, inclusive, shall be known as the Cluster Development Standards. The purpose of these provisions is to set forth development standards that must be met by cluster developments before they are granted a cluster development permit in accordance with the Cluster Development Procedures commencing at Section ____.

#_____ CONCEPT OF A CLUSTER DEVELOPMENT. A cluster development shall consist of a planned development as defined in #_____, located on a single tract of land, or on two or more tracts of land which may be separated only by a street or other right-of-way. In such planned development, the land and structures shall be confined to a specified portion of the site, leaving the remainder in a natural condition.

#_____ GENERAL DEVELOPMENT CRITERIA.

(a) Compatibility with Adjacent Land Uses. A cluster development shall be designed and developed in a manner compatible with and complementary to existing and potential residential development in the immediate vicinity of the project site and shall be in substantial harmony with the General Plan. Site planning on the perimeter shall give consideration to protection of the property from adverse surrounding influences, as well as protection of the surrounding areas from potentially adverse influences within the development.

(b) Relation to Natural Features. A cluster development shall relate harmoniously to the topography of its site; shall make suitable provision for preservation of watercourses, aquifer recharge areas, wooded areas, rough terrain and similar natural features and areas; shall avoid hazardous and damaging conditions, such as soil erosion; and shall otherwise be so designed as to use such natural features and amenities to best advantage.

#_____ APPLICABILITY OF USE REGULATIONS. Except as provided in Section ____, of this ordinance, only those uses which are permitted by right or by use permit in the underlying zone or as modified by the cluster development permit shall be permitted in a cluster development.

#_____ APPLICABILITY OF DEVELOPMENT REGULATIONS. Except as otherwise provided hereinafter, a cluster development shall conform to all portions of the Zoning Ordinance of (jurisdiction) which are relevant to the applicable underlying district or districts.

#_____ MAXIMUM DENSITY. The density regulations specified in the underlying zone shall apply in a cluster development; provided, however, that the following conditions shall supersede such provisions. In the event of conflict between underlying density regulations and the provisions of this section, the latter shall govern.

(a) Computation of Residential Acreage in an Exclusively Residential Cluster Development. In a cluster development devoted exclusively to residential uses, the residential acreage of the proposed development shall be not more than ____ percent of the total land area within the boundaries of the development and shall be predominately confined to a specified portion within such boundaries; provided, however, that this configuration does not conflict with other development standards set forth herein. For the purpose of the application of this subsection, the "total land area within the boundaries of the development" shall be defined to exclude any land within rights of way of state and federal highways and of collector, major or prime arterial roads as defined in the General Plan.

(b) Computation of Residential Acreage in a Cluster Development Containing Non-Residential Use Types. In cluster developments containing both residential and non-residential uses, the combined acreage of residential and non-residential acreage shall not exceed ____ percent of the total land area within the boundaries of the development and shall be predominately confined to a specified portion of such boundaries; provided, however, that this configuration does not conflict with other development standards set forth herein. For the purpose of the application of this subsection, the "total land area within the boundaries of the development" shall be defined as in subsection (a) of this section. To compute the maximum density permitted in a cluster development containing non-residential use types, the following steps shall be followed in computing the residential acreage of the proposed development;

1. Determine the total land area within the boundaries of the development.

2. Determine the total land area in residential use types.

3. Determine the total land area in nonresidential use types. For the purpose of the application of this section, the "total land area in nonresidential use types" shall be defined to exclude any land dedicated as permanent open space and any land with dedicated open space easements.

4. Compute the ratio of the total land area in residential use types (subsection (b)2) to the sum of the total land area in residential use types (subsection (b)2) plus the total land area in nonresidential use types (subsection (b)3).

5. Multiply the ratio computed in subsection (b)4 times the total land area within the boundaries of the development (subsection (b)1) to determine the residential acreage.

6. The Concept Plan submitted pursuant to the provisions of Section ____ shall be used in the computation of residential acreage.

(c) Findings of Residential Acreage. The (Director) shall compute the residential acreage following the steps either in subsection (a) or (b). The findings of the (Director) regarding the residential acreage of a proposed cluster development shall be communicated to the applicant at the concept plan review conference held pursuant to the provisions of #____.

(d) Applicable Maximum Density. The maximum density provisions of the applicable underlying zoning district shall be used in the computation of the permitted number of dwelling units.

(e) Permitted Number of Dwelling Units. The ratio of the proposed number of dwelling units to the maximum density determined in subsection (d) shall not exceed the allowable percentage of residential acreage determined in subsection (a) or (b); provided, however, that the Planning Commission may grant a density bonus of not more than five percent only upon a finding that such increased density is consistent with the General Plan and the purposes of these development criteria and that the proposed cluster development contains any of the following:

1. Over 80% of the parcel is kept free from alteration (except as required for natural resource management purposes) and is held in permanent common open space through appropriate forms of restrictions or public dedication.

2. A majority of the open space is usable for recreational purposes with less than 10% slope.

3. A mixture of housing types is provided with a range of prices for differing income levels, with the most costly home being at least ___% more expensive than the least costly.

4. Creative site planning is provided with substantial and appropriate landscaping.

5. A variety of transportation modes is encouraged through site design to reduce automobile usage and land with impervious surfaces.

#_____ HEIGHT. The height regulations of the underlying district or districts shall apply in a cluster development; provided, however, that the Planning Commission may approve buildings and structures of ___ percent greater height, if, in its opinion, such additional height would not have an adverse effect on adjacent properties or on properties or development in the vicinity and would be consistent with the General Plan and the purpose of these development standards. No additional height shall be approved within ___ feet of any external boundary of the cluster development adjacent to land in any residential or agricultural zone.

#_____ SETBACKS--PERIMETER. Provisions regarding required setbacks, as detailed in the Zoning Ordinance of (jurisdiction), shall apply to the perimeter of a cluster development; provided, however, that a setback of at least ___ feet from centerline shall be maintained by any building or structure, except a wall or fence, from any street along an exterior boundary of the development; provided further, however, that when such street has a right of way width greater than __ feet, a setback of __ feet from the right of way of such street shall be maintained. Otherwise, a setback of not less than ___ feet from an exterior boundary shall be maintained.

#_____ SETBACKS—INTERIOR. Provisions regarding required setbacks, as detailed in the underlying zone shall not apply to the interior of a cluster development.

#_____ SPACING BETWEEN BUILDINGS. Regulations regarding the space between buildings and space for front, side, and rear yards, as stipulated in the underlying zone, shall apply; provided, however, that the Planning Commission may waive such requirements if the following characteristics prevail, and if the Commission finds that such modifications to yard and building spacing requirements will not be detrimental to the purposes of this ordinance.

(a) Privacy. The minimum building spacing requirement is intended to provide privacy within the dwelling unit. Where windows are placed in only one of two facing walls or there are no windows, or where the builder provides adequate screening for windows, or where the windows are at such a height or location to provide adequate privacy, the building spacing may be reduced.

(b) Light and Air. The building spacing provides a method of ensuring that each room has adequate light and air. Building spacing may be reduced where there are no windows or very small window areas and where rooms have adequate provision for light and air from another direction.

(c) Use. Where areas between buildings are used as service yards, for storage of trash, clotheslines, or other uilitarian purposes, and this use is similar for both houses, a reduction of building space permitting effective design of a utility space shall be permitted.

(d) Building Configuration. Where building configuration is irregular so that the needs expressed in (a), (b), and (c) above are met by the building configuration, reduced building spacing is permissible, as determined by average spacing or by measuring spacing where rooms open toward adjacent buildings.

#_____ FRONT YARD. Where the developer provides privacy by reducing traffic flow through street layout such as cul-de-sacs, or by screening or planting, or by facing the structure toward open space or a pedestrian way, or through the room layout of front evaluation, a reduction of the front-yard requirement is permitted.

#_____ LOT WIDTH. In cul-de-sacs, steep slopes, or off-set lots where, because of lot configuration or topography, narrow or irregular lots provide the best possible design and the design is such that light, air, and privacy can be provided, especially for living spaces and bedrooms, a narrower lot width may be permitted.

#____ OPEN SPACE SURROUNDING BUILDINGS. Each building shall be surrounded by relatively level open space having a slope not greater than ___ percent and extending a minimum distance of ___ feet in all directions measured from the furthest projections of the external walls of the building.

#____ BUILDING APPEARANCE. Proposed developments shall use colors and materials which blend in with, rather than contrast with, the surrounding soil and vegetative cover of the sites. In wooded areas, all exterior construction materials shall be of deep earth hues such as dark browns, greens, and rusts. Materials shall absorb light (i.e., darker, rough textured materials). Exterior lighting shall be minimized, and earth tone colors of lights shall predominate (i.e. yellow toned lights rather than blue toned florescents). In grassland, or grassland/wooded cluster areas, exterior materials shall be of the same earth and vegetative tones as the predominant colors of the site. Highly reflective surfaces and colors shall be eliminated or ameliorated.

#____ OPEN SPACE. Regulations relating to the use of open space, as described in the underlying zone shall apply to a cluster development; provided, however, that the following requirements shall be met. In the event of a conflict between underlying provisions and those outlined herein, the more stringent shall apply.

(a) Minimum Usable Open Space. At least ___ percent of the open space in the development shall be usable open space. The area of each parcel of usable open space shall not be less than ___ square feet in area nor less than ___ feet in its smallest dimension and at least ___ percent of the required minimum usable open space shall have an overall finished grade not to exceed ___ percent.

(b) Remaining Open Space. Open space left in its natural state shall be kept free of litter and shall at no time constitute a health, safety, fire or flood hazard.

(c) Staged Development. If development is to be accomplished in stages, the development plan shall coordinate improvement of the open space, the construction of buildings, structures and improvements in such open space, and the construction of dwelling units in order that each development stage achieves a proportionate share of the total open space and environmental quality of the total cluster development.

(d) Reservation for Common Use. All or any part of the required open space, but not less than ___ percent of the total open space area, may be reserved for use in common by the residents of the cluster development. Areas permanently reserved for common open space shall be reserved for the use and enjoyment of the residents in a manner which makes the county or a public district or a public agency a party to and entitled to enforce the reservation. The Planning Commission may require that open space easements be conveyed to the county. Common open space shall be guaranteed by a restrictive convenant describing the open space and its maintenance and improvement running with the land for the benefit of residents of the cluster development or adjoining property owners or both. The developer must file in the office of the Recorder, at the time the approved final subdivision plat is filed, legal documents which will provide the aforesaid guarantees, and, in particular, will provide for restricting the use of common spaces for the designated purposes. All lands so conveyed shall be subject to the right of the grantee or grantees to enforce maintenance and improvement of the common space.

#_____ SIGNS. Signs shall be permitted in a cluster development in accordance with the underlying zone. Interior street, building and other signs shall be uniform in design.

#____ OFF-STREET PARKING. Off-street parking shall be provided in accordance with the underlying zone.

#____ CIRCULATION. All streets within the cluster development that by function fall within the system of classification of streets as specified in the General Plan shall be improved to road standards for the particular classification of street, and all such streets shall be offered for dedication to the public. When the developer desires to retain any such streets as private streets, the (Board) (Council) may reject the offer of dedication. Other forms of access, such as pedestrianways, courts, plazas, driveways or open parking lots shall not be offered for dedication. Forms of common access other than dedicated public streets shall be permanently reserved and maintained for their intended purpose by means acceptable to the (Planning Commission and local Counsel).

#____ ADDITIONAL STANDARDS FOR STREETS. In addition to the provisions already prescribed by road standards, the following standards shall apply to all cluster developments streets. In the event of a conflict between existing standards and those stated herein, the more stringent shall apply.

(a) Hillside street standards shall reflect a rural, rather than urban, character.

(b) Streets shall be designed for minimum land coverage and disturbance of soil.

(c) Variations in right-of-way standards shall be permitted to prevent the dedication of unnecessarily large parcels of land.

(d) One-way streets may be permitted where appropriate for the terrain and public safety.

(e) Street alignments shall generally follow contours.

(f) The maximum grade of any street shall not be over 15%.

(g) Streets shall not traverse slopes over 25% grade. Exceptions may be reasonable for short sections, not over 100 feet in length, if only a minor portion of the entire roadway length.

(h) Where street construction is permitted on steeper hillside lands, the extent of vegetation and visual disruption shall be minimized by regrading to approximate the natural grades.

(i) Cul-de-sacs or dead-end streets shall not be more than 700 feet in length.

(j) Curb, gutter, and pavement design shall be such that water on roadways is prevented from flowing off the roadway in an uncontrolled fashion.

(k) Sidewalks and walkways shall be provided in accordance with a carefully conceived total circulation plan and not rigidly included with every street.

(l) Bicycle and equestrian trails shall be integrated into the overall circulation plan.

#_____ EMERGENCY ACCESS. Any dwelling unit or other building that is located more than ___ feet from a public or private street or other vehicular way shall have access thereto capable of accommodating emergency and service vehicles.

#_____ FIRE PROTECTION. Fire hydrants and connections shall be installed as required by the Planning Commission and shall be of a type approved by the fire chief.

#_____ NIGHT LIGHTING. Lighting fixtures for walks, parking areas, driveways and other facilities shall be provided in sufficient number and at proper locations to assure safe and convenient nighttime use. For normal street lighting, applicable standards and regulations shall apply; however, in hillside areas every effort shall be made to minimize lighting where such reduction is not detrimental to the public safety and general welfare and to encourage low profile designs that are designed to enhance the area's rural character.

#____ MODIFICATION OF REQUIREMENTS. Modification of the Cluster Development Standards in #____ may be granted by the Planning Commission when it determines that such modification will not be detrimental to the subject development, adjacent properties or the public interest; provided, however, no modification shall be granted from the coverage/alteration provisions of Section ____.

CLUSTER DEVELOPMENT PROCEDURE

#____ TITLE AND PURPOSE. The provisions of Section ____ through Section ____, inclusive, shall be known as the Cluster Development Procedure. The purpose of these procedures is to provide for the application, review, and issuance of permits necessary to allow the development of land in conformance with the Cluster Development Standards commencing at Section ____. Any development involving the issuance of a cluster development permit shall conform to the Cluster Development Standards. It is the intent of these provisions that a cluster development permit be regarded as a type of use permit and all provisions of the (jurisdiction's) Zoning Ordinance, shall apply to cluster development permits. It is the further intent of these provisions to coordinate the Cluster Development Procedures as closely as possible with the requirements of the Subdivision Ordinance, when applicable, and the Environmental Impact Review process.

#____ CLUSTER DEVELOPMENT PERMIT REQUIRED. The following shall require cluster development permits:

(a) Cluster Development Regulations. Applications for granting, extending, or modifying a cluster development permit for any development requiring a cluster development permit pursuant to the provisions of the Cluster Development Regulations commencing at #____.

(b) Use Regulations. Applications for granting, extending, or modifying a cluster development permit for any use requiring a cluster development permit as specified in #____.

#____ APPLICATION FOR THE GRANTING OF A CLUSTER DEVELOPMENT PERMIT.

(a) Initiation of Review Process. By applying for the granting of a cluster development permit, the applicant initiates a three step review process comprised of concept plan review, preliminary development plan review, and final development plan review, which must be completed prior to the issuance of a cluster development permit. Each step of the review process is described in detail commencing at #____.

(b) Persons Eligible. An application for the granting of a cluster development permit may be made by any person having an interest in the property to be included in the proposed planned development; provided, however, that the applicant must evidence a full ownership interest in all of the property to be included in the proposed cluster development at the time of the submission of the final development plan.

(c) Required Documents. An application for the granting of a cluster development permit shall be accompanied by the following documents:

1. A list of the names of all persons having an interest in the application as well as the names of all persons having any ownership interest in the property involved. If any person indentified pursuant to this provision is a corporation or partnership, the names of all persons owning more than 10 percent of the shares in the corporation or owning any partnership interest in the partnership shall be listed. If any person identified pursuant to this provision is a non-profit organization or trust, the names of any person serving as director of the non-profit organization or as a beneficiary or trustee or trustor of the trust shall be listed.

2. A Concept Plan as prescribed in #____.

3. Application Form, Filing and Fee. An application for granting or extending, and waiving or modifying the conditions of a cluster development

permit shall be made on the prescribed form and shall be filed with the (________________) and shall be accompanied by the fee referenced in #_____.

#_____ CONCEPT PLAN. The applicant shall submit, at the time of his application for the granting of a cluster development permit, a Concept Plan containing the following:

(a) General Narrative. A generalized narrative describing the location of the site, its total acreage, and the existing character and use of the site and adjoining properties; the concept of the proposed cluster development, including proposed uses and activities, location of development, proposed residential densities if appropriate, coverage/land alteration percentages, and location of physical land alteration required by the development; as well as the relation of the proposed cluster development to the General Plan.

(b) General Site Plan. A generalized site plan showing the entire parcel with scehmatic indications of approximate locations of buildings, public and private rights-of-way, parking and loading areas, natural spaces, public and private usable open spaces, walkways, planting areas, etc.

(c) Environmental Impact Initial Study. An Environmental Impact Initial Study as provided by the (jurisdiction's) procedures for Environmental Impact Review.

#_____ CONCEPT PLAN REVIEW.

(a) Intent. The concept plan review is designed to inform an applicant for the granting of a cluster development permit of the applicable regulations of (jurisdiction); to inform the (Director) of the applicant's intentions, and to provide an opportunity to identify environmental and other pertinent considerations associated with a proposed planned development before a substantial commitment of resources occurs.

(c) Timing. Concept Plan Review shall be initiated by the (Director) upon receipt of the cluster development permit application, including the Concept Plan.

(d) Elements of Review. Concept Plan Review includes the following elements: Concept Plan Review Conference held by the (Director) with the applicant; and a review of any Environmental Impact Initial Study.

#_____ CONCEPT PLAN REVIEW CONFERENCE. On receipt of the application and preliminary concept plan and proposals as indicated above, the planning staff and other agencies and officials, as appropriate in the circumstances of the case, shall study the proposal to determine conformity with the General Plan, 208 Plan, zoning, and other regulations applicable in the case.

Following such study, unless complete conformity is found, the applicant shall be notified in writing of the discrepancies, and the planning department and other appropriate officials shall schedule a meeting to confer for the purpose of assisting him in bringing the material submitted as nearly as possible into conformity with requirements and/or to define specifically modifications of regulations or of the General Plan that seem justified in view of equivalent service of public purposes, by the proposal. Any recommendations for changes shall be recorded in writing, with reasons therefor, and shall become part of the record in the case. Applicants shall indicate, in writing, their agreement to such recommendations, or their disagreement and reasons therefor; and such response by applicants shall also be included in the record.

#_____ DETERMINATION OF ENVIRONMENTAL EFFECT. Following the submission of any Environmental Impact Initial Study pursuant to application for granting of a cluster development permit, and within the time limit prescribed by the (jurisdiction's) procedures for Environmental Impact Review, the (Director) shall determine if the proposed cluster development could have significant environmental effects and requires the preparation of an Environmental Impact Report. If the proposed cluster development is determined to require an Environmental Impact Report, the applicant shall be required to submit a draft Environmental Impact Report, with appropriate mitigation measures.

#_____ PRELIMINARY DEVELOPMENT PLAN. The Preliminary Development Plan shall be prepared by the applicant based on the Concept Plan submitted during Concept Plan Review and on recommendations for changes pursuant to the Concept Plan Review Conference. All elements required within the Preliminary Development Plan shall be characterized as existing or proposed, and be sufficiently detailed to indicate intent and impact. The Preliminary Development Plan shall include the following:

(a) Statement of Intent. An overall development scheme which states the development intentions of the landowner respecting his property, including but not limited to the following:

1. Written Documents.

   - A legal description of the total site proposed for development, including a statement of present and proposed ownership and present and proposed zoning.

   - A statement of planning objectives to be achieved by the cluster development through the particular approach proposed by the applicant. This statement shall include a description of the character of the proposed development and the rationale behind the assumptions and choices made by the applicant.

   - A statement of location and intensity of proposed uses and activities including public and private open spaces;

   - A physical description of proposed facilities accommodating such uses, including types of buildings structures and landscape and circulation elements;

- A statement of location and general configuration of lands to remain in open space;

- A general designation of utilities;

- A general statement of form of site management proposed in areas of significant natural resources;

- A statement detailing the consistency of the proposed development project with major public development programs, including but not limited to freeways, highways, parks, trails, open spaces, utility transmission lines and the phased schedules of proposed major public facilities; and

- A statement of the applicant's intentions with regard to the future selling or leasing of all or portions of the cluster development, such as land areas, dwelling units, etc.

(b) Supporting Graphics. A Statement of Intent required in subsection (a) above shall be supported by such graphics as are necessary to establish the physical scale and character of the development and demonstrate the relationship among its constituent land uses, oepn spaces, buildings, and structures, and public facilities. Said graphics shall as a minimum indicate:

1. The existing site conditions including contours at ____ foot intervals (depending on local topographic conditions), watercourse, floodplains, unique natural features, and forest cover.

2. The location and extent of unique natural features, including but not limited to aquifer recharge areas, highly erodible soils, seismic hazard areas, flood prone areas, aesthetic views, and valuable wildlife, and plant habitats, that impose constraints on the location of various uses in the project area.

3. Proposed lot lines and plot designs.

4. The location and floor area size of all existing and proposed buildings, structures, and other improvements including maximum heights, types of dwelling units, density per type, and nonresidential structures, including commercial facilities.

5. The location and size in acres or square feet of all areas to be conveyed, dedicated, or reserved as common open spaces, public parks, recreational areas, school sites, and similar public and semipublic uses.

6. The existing and proposed circulation system of arterial, collector, and local streets including off-street parking areas, service areas, loading areas, and major points of access to public rights-of-way (including major points of ingress and egress to the development). Notations of proposed ownership--public or private--should be included where appropriate. (Detailed engineering drawings of cross sections and street standards should be handled in the final development plan stage.)

7. The existing and proposed pedestrian circulation system, including its interrelationships with the vehicular circulation system, indicating proposed treatments of points of conflict.

8. The existing and proposed utility systems including sanitary sewers, storms sewers, as well as other stormwater runoff control measures, and water, electric, gas and telephone lines.

9. A general landscape plan indicating the treatment of materials used for private and common open spaces.

10. Enough information on land areas adjacent to the proposed cluster development to indicate the relationships between the proposed development and existing and proposed adjacent areas, including land uses, zoning classifications, densities, circulation systems, public facilities, and unique natural features of the landscape.

11. The proposed treatment of the perimeter of the cluster development, including materials and techniques used such as screens, fences, and walls.

(c) Background Report. The purpose of the Background Report is to collect and present information pertinent to the actual execution and operation of the cluster development. The contents of the Background Report shall be determined during the Concept Plan Review Conference, required by #_____, and may include but is not limited to the following information: a preliminary title report on the land included within the boundaries of the site; a preliminary development schedule including anticipated timing for commencement and completion of each phase of development, tabulation of the total number of acres in each separate phase and percentage of such acreage to be devoted to particular uses, and an indication of the proposed number and type of dwelling units by phase of development; a preliminary population schedule, including estimated residential population for the entire project at its completion and for each type of dwelling unit for each phase of development, calculation of the average residential density per gross acre and per net residential acre by phase, and estimated nonresidential population for each phase of development; an indication of the retail market area to be served by any nonresidential uses included in the proposal and sufficient economic data to support inclusion of such nonresidential uses; and engineering feasibility studies.

(d) Any additional information as required by the review authority necessary to evaluate the character and impact of the proposed cluster development.

#_____ PRELIMINARY DEVELOPMENT PLAN REVIEW

(a) Intent. Preliminary Development Plan Review shall provide an opportunity for detailed review of proposed cluster developments by (jurisdiction's) officials and the general public.

(b) Timing. Preliminary Development Plan Review shall be initiated by the (Director) after the completion of all of the elements of Concept Plan Review, and upon the receipt from the applicant of a Preliminary Development Plan.

(c) Elements of Review. Preliminary Development Plan Review includes the following elements: a Preliminary Development Plan Review Conference; preparation and submission of a draft Environmental Impact Report, if required, by the applicant; review and acceptance of the draft Environmental Impact Report by the (Director); public review and response to the Preliminary Development Plan and the draft Environmental Impact Report through public hearing; preparation of the final Environmental Impact Report by the (Director); and decision by the Planning Commission on the Preliminary Development Plan and the final Environmental Impact Report.

(d) Coordination with Subdivision Ordinance. It is the intent of these provisions that subdivision review under the Subdivision Ordinance, if required, be carried out simultaneously with the review of the proposed cluster development prescribed by this section of the ordinance.

#_____ PRELIMINARY DEVELOPMENT PLAN REVIEW CONFERENCE. Within ___ days of receipt of the completed Preliminary Development Plan, the (Director) shall schedule and hold a Preliminary Development Plan Review Conference, which shall be attended by the applicant, and representatives from other departments or agencies invited by the (Director) to review the Preliminary Development Plan. At least the following shall be considered at the Conference: compliance of various elements proposed in the Preliminary Development Plan with the Cluster Development Regulations and other applicable regulations and ordinances of (the jurisdiction); new information, if any, not previously noted in the Concept Plan that would necessitate the inclusion of supplemental information in the Environmental Impact Report and particular subjects proposed in the Preliminary Development Plan to receive special detailed attention in the Environmental Impact Report. The Preliminary Development Plan shall be made available for public review and comment concurrently with the release of the Draft Environmental Impact Report, as provided in #_____.

#____ ENVIRONMENTAL IMPACT REPORT REVIEW. Upon submission of the draft Environmental Impact Report by the applicant, if required pursuant to #____, the (Director) shall review it and accept it if complete. The (Director) shall then make the completed draft Environmental Impact Report available for public review and comment as provided by the (jurisdiction's) procedures for Environmental Impact Review.

#____ PUBLIC HEARING BEFORE PLANNING COMMISSION. Within ___ but not less than ___ days after the Draft Environmental Impact Report is made available for public review, at least one public hearing, noticed as required by #____ shall be held before the Planning Commission to obtain public response to the Preliminary Development Plan and the Draft Environmental Impact Report. When appropriate, the hearing also may include material submitted as required by the Subdivision Ordinance.

#____ PREPARATION OF FINAL ENVIRONMENTAL IMPACT REPORT. Unless circumstances otherwise merit, within ___ days after acceptance of a Draft Environmental Impact Report, the (Director) shall cause to be prepared the final Environmental Impact Report on the proposed cluster development. When complete, the final Report shall be forwarded to the Planning Commission with the findings of the (Director).

#____ PLANNING COMMISSION DECISION. Upon receipt of the final Environmental Impact Report, the Planning Commission shall certify the final Report as provided by the (jurisdiction's) procedures for the Environmental Impact Report Review. Once the final Report is certified, the Commission shall determine if the Preliminary Development Plan, either in its present form or with minor revisions required by the Commission and agreed to by the applicant, satisfies the Cluster Development Standards, commencing at #____ and ____ fulfills the purposes expressed in this ordinance. If the Commission is able to make these required findings, the applicant shall be granted a cluster development permit, subject to the condition that he shall provide the minor revisions required by the Commission and agreed to by him. If the Commission determines that the Preliminary Development Plan is unacceptable in its present form or requires major revisions, as such revisions are defined by the Commission, the applicant shall not be granted a cluster development permit, unless he complies with the requirements of Final Development Plan Review, as provided by #____. When appropriate, the Planning Commission decision pursuant to this Section may also include material submitted as required by the Subdivision Ordinance.

(a) Amendment to the Preliminary Development Plan. Minor changes in the location, siting, and height of buildings and structures may be authorized by the Commission without additional public hearings if required by engineering or other circumstances not foreseen at the time the preliminary development plan was approved. No change authorized by this subsection may cause any of the following:

1. A change in the use or character of the development;
2. An increase in overall coverage of structures;
3. An increase in the intensity of use;
4. An increase in the facilities for traffic circulation and public utilities;
5. A reduction in approved open space;
6. A reduction of off-street parking and loading space; or
7. A reduction of required pavement widths.

All other changes in use, or rearrangement of lots, blocks, and building tracts, or any changes in the provision of common open spaces and changes other than listed above, must be made by the (Board) (Council) after report of the planning staff and recommendation by the (Commission). Such amendments may be made only if they are shown to be required by changes in conditions that have occurred since the plan was approved or by changes in community policy. Any changes which are approved in the plan must be recorded as amendments in accordance with the procedure established for the recording of the initial plan documents.

(b) Amendment to General Plan. If amendment of the General Plan is involved, (Board) (Council) shall not proceed on the cluster development amendment until it has acted on amendment of the General Plan.

If the amendment is granted, (Council) (Board) shall, in its amending action, approve the preliminary development concept plan as it may have been changed during earlier procedures, or indicate required modifications; and such approved development concept plan, with required modifications, if any, shall be binding in determinations concerning final development plans. If modifications are required, (Board) (Council) shall officially state its reasons therefor in the record.

If the amendment is granted, the development shall be required to be in accord with final development plans meeting the requirements of these and other regulations, as supplemented or modified by (Board) (Council) in the particular case as part of the amending action, and shall conform to any time or priority limitations established by (Board) (Council) on beginning and completion of the development as a whole, or in specified stages.

At the time of amendment (Board) (Council) shall pass upon the adequacy in form and substance of any agreements, contracts, deed restrictions, sureties, or other instruments involved; and, before development may proceed, such instruments shall be approved by appropriate officers and agencies.

#_____ FINAL DEVELOPMENT PLAN REVIEW. A Final Development Plan shall incorporate major revisions required by the Planning Commission and must be submitted to the (Director) within ___ days of the date of the Planning Commission decision pursuant to #_____, accompanied by a supplemental draft Environmental Impact Report addressing all major revisions and changes to the Preliminary Development Plan. If the Final Development Plan has made recommended changes as required by #_____ of this ordinance, a cluster development permit shall be granted and a cluster development district created. If the applicant fails to apply for final approval for any reason, the tentative approval shall be deemed to be revoked and all that portion of the area included in the development plan for which final approval has not been given shall be subject to the zoning and subdivision ordinances otherwise applicable thereto.

#____ APPROVAL OF FINAL PLANS AND REPORTS. After a cluster development district has been established, no building permit shall be issued therein unless the Planning Department has approved final plans and reports for the development as a whole or stages or portions thereof deemed satisfactory in relation to total development. The form and content of such final plans and reports shall be as prescribed in zoning, subdivision regulations, or other regulations involved, generally or for particular cluster development districts, and in rules of the Planning Department and other affected agencies.

Approval of final plans and reports shall be based on substantial compliance with the Concept Plan, with any modifications required by (Board) (Council) applying at the time the land was zoned to cluster development status, and with regulations applying at the time it was rezoned to cluster development status, including such specific modifications as were made by (Board) (Council), or at the option of the applicant or his successors in interest in accordance with regulations currently in effect when the final plan is being considered, subject to the same modifications if they affect current regulations in the same way.

Upon approval of final plans and reports, building permits shall be issued in the same manner as for building permits generally, provided that any requirements concerning the order and location in which building permits are to be issued in the particular cluster development district shall be observed. Except as provided below, final plans and reports approved shall be binding on the applicants and any successors in title so long as cluster development zoning applies to the land.

#_____ FAILURE TO BEGIN DEVELOPMENT. If no construction has begun in the cluster development within ___ months from the approval of the permit and recording of documents, said approval shall lapse and be of no further effect. The Planning Commission, upon showing of good cause by the developer, may extend for period(s) of ___months, the time for beginning construction.

The applicant must begin and substantially complete the development of the planned unit within ___years from the time of its final approval. If the cluster development is to be developed in stages, the applicant must begin and substantially complete the development of each stage within ___ years of the time provided for the start of construction of each stage in the development schedule.

If the applicant does not begin and substantially complete the development, or any stage of the development, within the time limits imposed by the preceding section, the (Director) shall review the development and may recommend that the time for completion of the development be extended, that the approval of the development be revoked, or that the plan be amended.

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Source Control." (Memorandum prepared for all Regional Administrators.) September 22, 1977.

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